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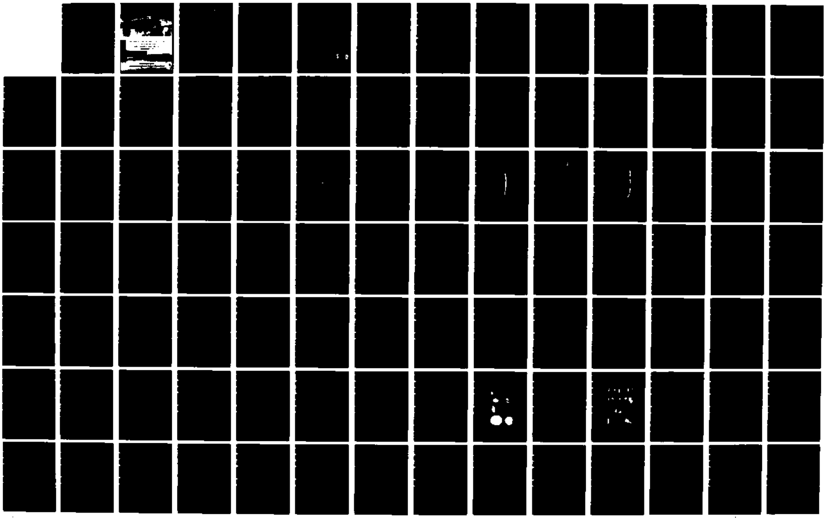

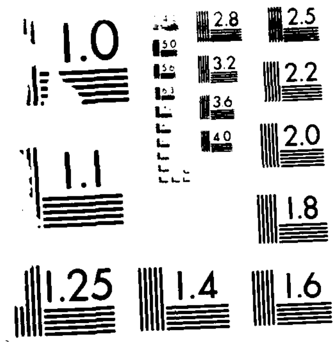

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UNIVERSITY OF WASHINGTON, OFFICE OF PUBLIC ARCHAEOLOGY
for U.S. ARMY CORPS OF ENGINEERS, SEATTLE DISTRICT

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ARCHAEOLOGICAL INVESTIGATIONS AT SITE 45-OK-258, CHIEF JOSEPH DAM PROJECT, WASHINGTON

by Manfred E. W. Jaehnig

with S. Neal Crozier, Stephanie Livingston, Nancy A. Stenholm

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Site 45-OK-258 is on the north bank of the Columbia River about 125 meters upstream from River Mile 576. Vegetation is characteristic of the Upper Sonoran life zone. The University of Washington excavated 4,882.9 cubic meters of site volume in 1978 and 1979 for the U.S. Army Corps of Engineers, Seattle District, as part of a mitigation program associated with adding 10 feet to the operating pool level behind Chief Joseph Dam. A two-stage sampling design, incorporating random and nonrandom 1 x 1 x .01 meter units of record, disclosed multiple episodes of prehistoric occupation spanning a period from about 3600 to about 100 years ago. Two major occupational components associated with 6 stratigraphically defined analytic zones are evident. The first component dates roughly between 3600 and 2400 years ago, and has 4 associated housepits. Assemblages associated with both the house floors and external surfaces suggest the site was a central base, a probable winter village, associated with the Hudnut Phase (4000 to 2000 B.P.). Faunal assemblages of this component contain a high percentage of carnivores; strong emphasis on consumption of fish is suggested by the high frequency of burned and broken salmonid vertebrae. The second component is dated from about 800 years ago to the modern era, and associated with the Coyote Creek Phase (2000 to 150 B.P.). It contains at least one housepit, and several occupation surfaces. It appears to represent a central base, but may have changed useages to a field camp within the occupation span. Horse remains indicate a protohistoric association late in the occupation. Archaeobotanical analysis is presented for both components, documenting the earliest known occurrence of a cache of the seeds of <u>Chenopodium femontii</u> (about 2800 B.P.) in the Plateau.

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Manfred E.W. Jaehnig

with

S. Neal Crozier, Stephanie Livingston and Nancy A. Stenholm

Principal Investigators

R.C. Dunnell 1978-1984
D.K. Grayson 1978-1981
M.E.W. Jaehnig 1981-1984
J.V. Jermann 1978-1981

Final report submitted to the U.S. Army Corps of Engineers, Seattle District, in partial fulfillment of the conditions and specifications of Contract No. DACW67-78-C-0106.

The technical findings and conclusions in this report do not necessarily reflect the views or concurrence of the sponsoring agency.

Office of Public Archaeology
Institute for Environmental Studies
University of Washington

1985

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF PLATES

PREFACE

The Chief Joseph Dam Cultural Resources Project (CJDCRP) has been sponsored by the Seattle District, U.S. Army Corps of Engineers (the Corps) in order to salvage and preserve the cultural resources imperiled by a 10 foot pool raise resulting from modifications to Chief Joseph Dam.

From Fall 1977 to Summer 1978, under contract to the Corps, the University of Washington, Office of Public Archaeology (OPA) undertook detailed reconnaissance and testing along the banks of Rufus Woods Lake in the Chief Joseph Dam project area (Contract No. DACW67-77-C-0099). The project area extends from Chief Joseph Dam at Columbia River Mile (RM) 545 upstream to RM 590, about seven miles below Grand Coulee Dam, and includes 2,015 hectares (4,979 acres) of land within the guide-taking lines for the expected pool raise. Twenty-nine cultural resource sites were identified during reconnaissance, bringing the total number of recorded prehistoric sites in the area to 279. Test excavations at 79 of these provided information about prehistoric cultural variability in this region upon which to base further resource management recommendations (Jermann et al. 1978; Leeds et al. 1981).

Only a short time was available for testing and mitigation before the planned pool raise. Therefore, in mid-December 1977, the Corps asked OPA to review the 27 sites tested to date and identify those worthy of immediate investigation. A priority list of six sites, including 45-OK-258, was compiled. The Corps, in consultation with the Washington State Historic Preservation Officer and the Advisory Council on Historic Preservation, established an interim Memorandum of Agreement under which full-scale excavations at those six sites could proceed. In August 1978, data recovery (Contract No. DACW67-78-C-0106) began at five of the six sites.

Concurrently, data from the 1977 and 1978 testing, as well as those from previous testing efforts (Osborne et al. 1952; Lyman 1976), were synthesized into a management plan recommending ways to minimize loss of significant resources. This document calls for excavations at 34 prehistoric habitation sites, including the six already selected (Jermann et al. 1978). The final Memorandum of Agreement includes 20 of these. Data recovery began in May 1979 and continued until late August 1980.

Full-scale excavation could be undertaken at only a limited number of sites. The testing program identified sites in good condition that were directly threatened with inundation or severe erosion by the projected pool raise. To aid in selecting a representative sample of prehistoric habitation sites for excavation, site "components" defined during testing were characterized according to (1) probable age, (2) probable type of occupation, (3) general site topography, and (4) geographic location along the river

(Jermann et al. 1978:Table 18). Sites were selected to attain as wide a diversity as possible while keeping the total number of sites as low as possible.

The Project's investigations are documented in four report series. Reports describing archaeological reconnaissance and testing include (1) a management plan for cultural resources in the project area (Jermann et al. 1978), (2) a report of testing at 79 prehistoric habitation sites (Leeds et al. 1981), and (3) an inventory of data derived from testing. Series I of the mitigation reports includes (1) the project's research design (Campbell 1984d) and (2) a preliminary report (Jaehnig 1983b). Series II consists of 14 descriptive reports on prehistoric habitation sites excavated as part of the project (Campbell 1984b; Jaehnig 1983a, 1984a,b; Lohse 1984a-f; Miss 1984a-d), reports on prehistoric nonhabitation sites (Campbell 1984a) and burial relocation projects (Campbell 1984c), and a report on the survey and excavation of historic sites (Thomas et al. 1984). A summary of results is presented in Jaehnig and Campbell (1984).

This report is one of the Series II mitigation reports. Mitigation reports document the assumptions and contingencies under which data were collected, describe data collection and analysis, and organize and summarize data in a form useful to the widest possible archaeological audience.

ACKNOWLEDGEMENTS

This report is the result of the collaboration of many individuals and agencies. During the excavation and early reporting stages, Coprincipal Investigators were Drs. Robert C. Dunnell and Donald K. Grayson, both of the Department of Anthropology, University of Washington, and Dr. Jerry V. Jermann, Director of the Office of Public Archaeology, University of Washington. I served as Project Supervisor during this stage of the work. From the autumn of 1981 until December 1984, I served as Coprincipal Investigator with Dr. Dunnell.

Three Corps of Engineers staff members have made major contributions to the project. They are Dr. Steven F. Dice, Contracting Officer's Representative, and Corps archaeologists Lawr V. Salo and David A. Munsell. Both Mr. Munsell and Mr. Salo have worked to assure the success of the project from its initial organization through site selection, sampling, analysis, and report writing. Mr. Munsell provided guidance in the initial stages of the project and developed the strong ties with the Colville Confederated Tribes essential for the undertaking. Mr. Salo gave generously of his time to guide the project through data collection and analysis. In his review of each report, he exercises that rare skill, an ability to criticize constructively.

We have been fortunate in having the generous support and cooperation of the Colville Confederated Tribes throughout the entire length of project. The Tribes' Business Council and its History and Archaeology Office have been invaluable. We owe special thanks to Andy Joseph, representative from the Nespelem District on the Business Council, and to Adeline Fredin, Tribal Historian and Director of the History and Archaeology Office. Mr. Joseph and the Business Council, and Mrs. Fredin, who acted as liaison between the Tribe and the project, did much to convince appropriate federal and state agencies of the necessity of the investigation. They helped secure land and services for the project's field facilities as well as helping establish a program which trained local people (including many tribal members) as field excavators and laboratory technicians. Beyond this, their hospitality has made our stay in the project area a most pleasant one. In return, conscious of how much gratitude we wish to convey in a few brief words, we extend our sincere thanks to all the members of the Colville Confederated Tribes who have supported our efforts, and to Mrs. Fredin and Mr. Joseph, in particular.

Site 45-OK-258 is located on land owned by Gilbert L. Johnston whom we thank for granting us permission to excavate the site.

As author of this report, I take responsibility for its contents. What we have written here is only the final stage of a collaborative process which is analogous to the integrated community of people whose physical traces we have studied. Some, by dint of hard labor and archaeological training, salvaged those traces from the earth; others processed and analyzed those traces; some manipulated the data and some wrote, edited and produced this report. Each is a member of the community essential to the life of the work we have done.

Jerry V. Jermann, Coprincipal Investigator during the field excavation and artifact analysis phase of the project, developed site excavation sampling designs that were used to select data from each site. The designs provided a uniform context for studying prehistoric subsistence-settlement patterns in the project area.

S. Neal Crozier did the initial data summary for the stratigraphic analysis as well as the depositional unit analysis and the chemical and mechanical sort analyses. The laboratory staff did the technological and functional artifact analysis. Janice Jaehnig did keypunching and John Chapman and Duncan Mitchell manipulated the computerized data.

The writing of the report itself is an interdisciplinary effort. I wrote Chapters 1 and 3, and the cultural stratigaphy section of Chapter 2. As senior author, I also coordinated and integrated the contributions of the other authors. S. Neal Crozier analyzed the stratigraphy and wrote the first half of Chapter 2. Stephanie Livingston analyzed the faunal assemblage and wrote Chapter 4. Nancy Stenholm analyzed the botanical assemblage, and wrote Chapter 5. Dorothy Sammons-Lohse analyzed the features and wrote Chapter 6.

Marc Hudson edited the text except Chapter 3 beyond technological analysis and Chapter 7. Production editing was done by Sarah Campbell. Dawn Brislawn typed the text and coordinated production, and Pippa Colley took over this job for the final draft. I prepared working copy of many of the figures; Melodie Tune and Bob Radek drafted the final versions. Larry Bullis photographed the artifacts and provided the cover photograph.

Manfred E.W. Jaehnig

1. INTRODUCTION

Site 45-OK-258 is located on the right bank of the Columbia River about 125 meters upstream from River Mile (RM) 576 in the SW1/4 SW1/4 Section 34, T31N, R29E, Willamette Meridian; U.T.M. Zone 11, N.5333764, E.338847 on the Colville Indian Reservation in Okanogan County (Figure 1-1). Set on a low, narrow river terrace 290 m (951 ft) above mean sea level (m.s.l.) and about 11 m above the original river level, the site is surrounded on the east, north and south by steeply rising alluvial/colluvial slopes (Figure 1-2). The eroding Rufus Woods Lake bank encroaches on the site to the south.

The surrounding topography is varied. To the north, the land rises to the steep, talus slopes just below the northern canyon rim. Before the original pool rise, the Mahkin rapids were about 3.2 km downstream. About 0.7 km downstream is Hopkins Canyon, with a small, intermittent stream. The Lee Canyon and Weber Canyon drainage system is about 2.2 km upstream from the site. All three canyons host growths of broadleaf trees and shrubs. Weber Canyon also provides relatively easy access to the Okanogan Highlands to the north, with their dense coniferous forests. The nearest edges of this forest are less than 1 km north of the site, at the edge of the canyon rim. Across the river to the southeast, the canyon rim is about 1.5 km from the site. From there, the sage-covered steppes of the Columbia Plateau are another 4 km south. The Plateau can be reached by the broad, gently rising canyon of China Creek. On the Plateau, within 10 km of the site, are a number of pothole lakes.

The Columbia Plateau has a semiarid climate characterized by hot summers and moderately cold winters (Daubenmire 1970:6). In summer, clear skies prevail; temperatures are warm to hot during the day and cool at night. In winter and early spring, storm fronts from the north Pacific bring overcast skies. The marine air masses, however, lose most of their moisture crossing the coastal mountain ranges to the west, so that overall precipitation in the project area is slight, averaging about 25 cm per annum. Winter temperatures are cold, but moderated by marine air flows and the low elevation of the project area.

The site lies within the *Artemesia tridentata*-*Agropyron* vegetation association of the area (Daubenmire 1970). This vegetation zone is characterized by sagebrush and bunch grass communities with brushy thickets along stream courses. Vegetation on the site consists of grasses (*Agropyron spicatum* dominant) and, at the margins of the site, sagebrush (*Artemesia* sp.) and scattered bitterbrush (*Purshia tridentata*), and a few prickly pear cactus. Cattle are grazed on the terrace each spring and early summer.

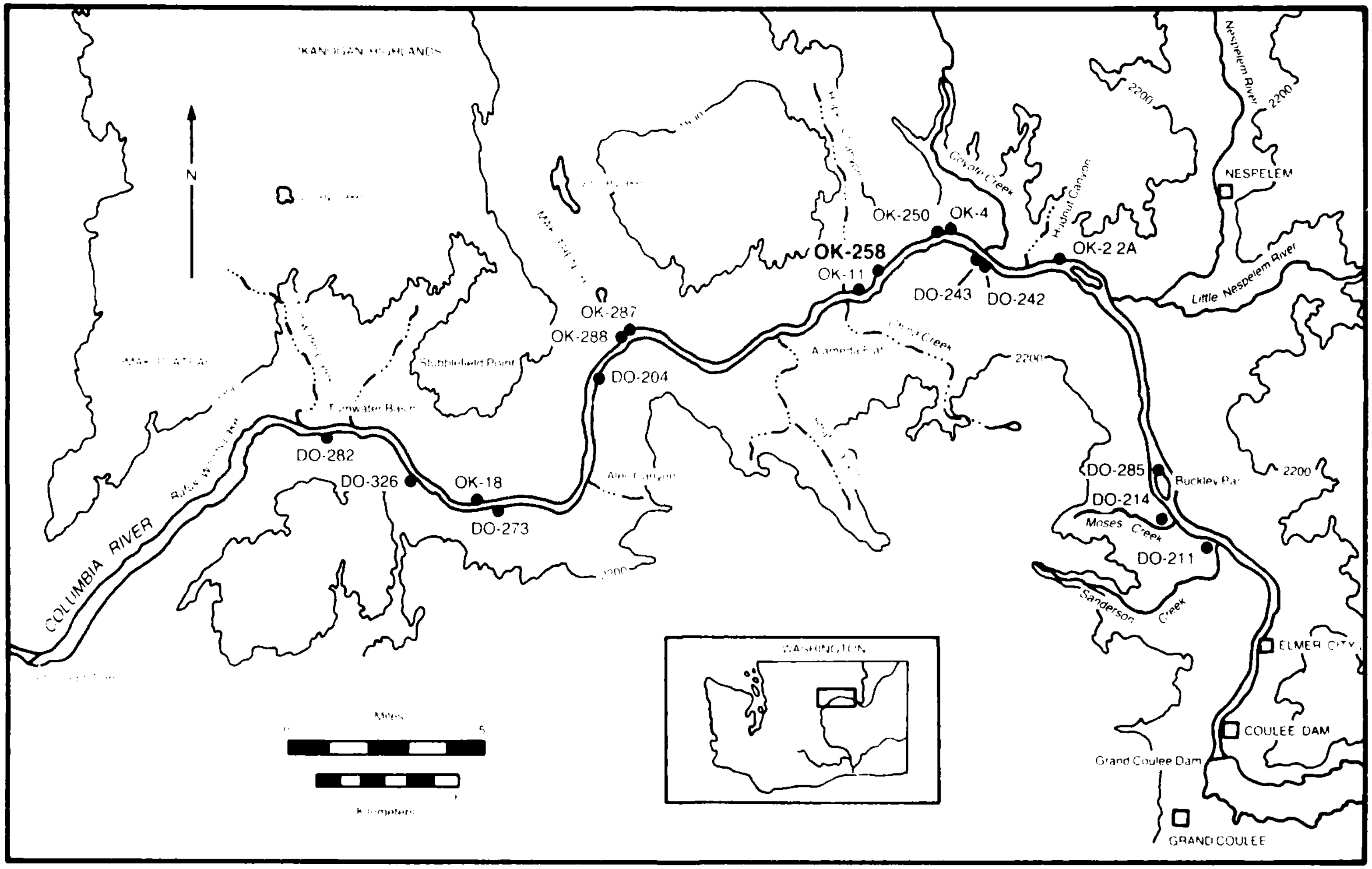


Figure 1-1. Map of project area showing locaton of 45-OK-258.

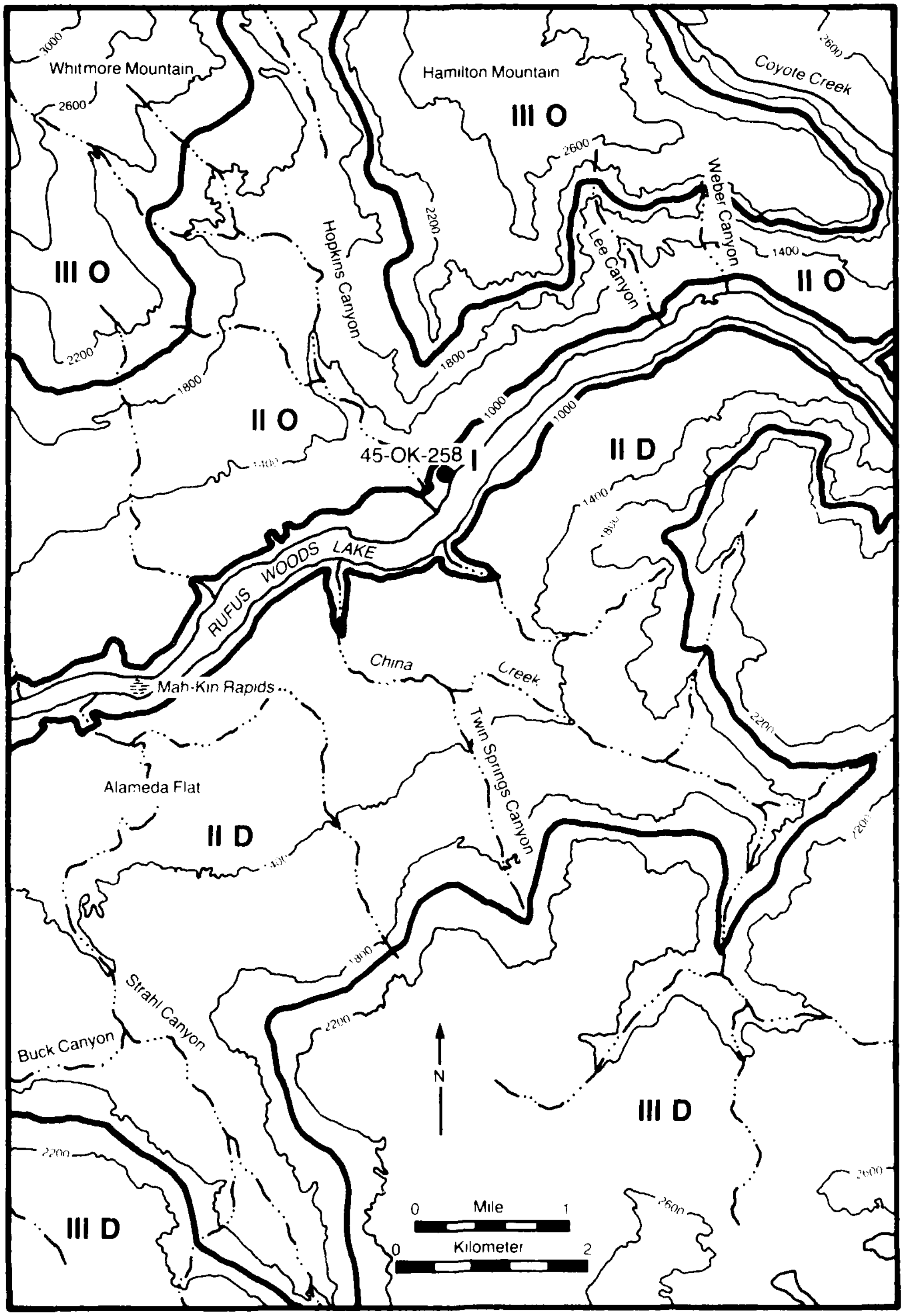


Figure 1-2. Map of site vicinity, 45-OK-258.

INVESTIGATIONS AT 45-OK-258

Site 45-OK-258 was one of the sites originally recommended for excavation in 1978 and included in the interim Memorandum of Agreement. At the time the first six sites were recommended for excavation, testing had been completed at only 27 of 79 sites scheduled for evaluation. During the testing, sites were identified that were in good condition and directly threatened with inundation or severe erosion by the projected pool raise.

Five 1 x 2-m sampling units were excavated at the site during testing operations in the fall of 1977. They were placed along the 3N and 0N grid lines, parallel to and up to 10 m from the eroding bank along Rufus Woods Lake (Figure 1-3). Site boundaries were determined by excavating shovel test holes about 50 cm in diameter. Tests yielded sufficient information for the site to be included among those chosen for further, more intensive data recovery (Jermann et al. 1978).

Like the other five sites chosen for the initial sample, 45-OK-258 was recommended because it contained information important to the understanding of variation in prehistoric site form and function. First, testing revealed at least three cultural components. The earliest of these components yielded a date of 3899$\pm$491 B.P. (TX-3063), placing it into Rufus Woods Lake (RWL) Cultural Period IV (4000-3500 B.P.). The second component was dated to 3054$\pm$232 B.P. (TX-2906) and 2763$\pm$235 B.P. (TX-2905), placing it into RWL Cultural Period V (3500-2500 B.P.). Both of these cultural periods are now included in the project's Hudnut Phase. Stylistic attributes of projectile points indicated that the third component was from RWL Cultural Period VIII (500-150 B.P.). Thus the site promised to yield artifact assemblages from relatively early and quite late occupations. Second, cultural materials at the site were among the most dense at any tested site in the project area and the site was complex, indicating that much information was available. Third, surface housepit depressions and test excavations showed the site to be a winter village, an important attribute because it was one of only two housepit sites among the original six sites chosen for excavation.

We hoped that the excavation of site 45-OK-258 would shed light on several salient questions of regional archaeology. While the earliest site component yielded no evidence of housepits, the second component did. We surmised that this change at the site might provide insights about the transition from open camps to winter villages in the project area. Furthermore, at the time of site selection, the housepits in the second site component were the earliest evidence of winter villages in the area along the Columbia River from its headwaters to its confluence with the Snake River. However, an earlier housepit site has since been found in the project area at 45-OK-11. As it turned out, then, the transition to winter villages could not be investigated at 45-OK-258; however, the site could provide evidence about variation in housepit construction and content among cultural periods.

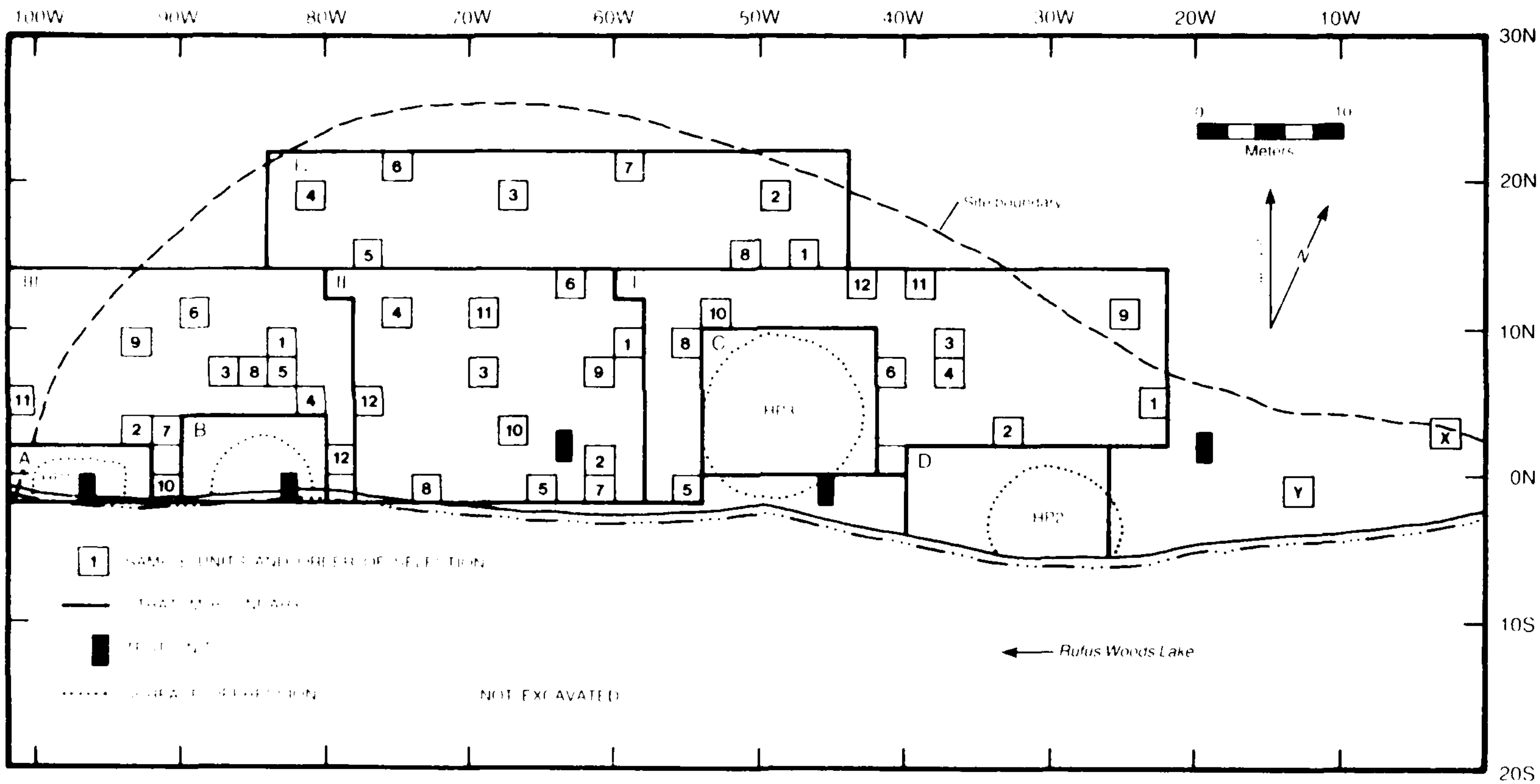


Figure 1-3. Probabilistic sampling design, 45-OK-258.

Site complexity and artifact density suggested that sufficient data would be forthcoming to reconstruct activity areas within and outside of housepits. These could then be used to compare and contrast with activity areas from other housepit sites representing other components, and with activity areas of open camps of the same components. In addition, testing data included large numbers of faunal remains and relatively high densities of charred plant remains, showing that details of food procurement, food preparation and dietary habits of the site's occupants could be investigated to reconstruct the lifeways of people living in the project area 3,700 to 2,700 and 500 to 150 years ago.

Full scale excavations began August 1 1978 and were temporarily halted November 30 1978. Data recovery was resumed May 15 1979 and operations were terminated September 28 1979. A crew of 10 to 17 excavators and a site supervisor carried on the field work during the first excavation season. Between 11 and 14 excavators and a supervisor worked the site from May through the middle of July 1978; thereafter, the crew was reduced to four to six excavators until excavations were terminated. A total of 4,882.9 cubic meters of site volume was excavated.

For the full scale excavations at the site, a two stage sampling design was developed that was applied differently in site areas without surface evident housepits and areas with housepits. During the first stage, a **probabilistic** sample of units was selected for excavation in areas without housepits and a **purposive** sample was selected for housepit areas. During the second stage, a purposive sample was selected to provide additional information about site structure in areas without housepits.

Sampling strata were developed by superimposing a 2-m square grid of 407 units on the site area defined during test excavations. Boundaries were then drawn around units that fell within and just outside housepit depressions. This resulted in four housepit strata, labelled Strata A through D (Figure 1-3). The remaining units were divided into four strata of almost equal size, labelled Strata I-IV (Figure 1-3). The following discussion is divided into non-housepit and housepit sampling designs for clarity.

NON-HOUSEPIT SAMPLING

Probabilistic sampling of the non-housepit area at 45-OK-258 was done within a **stratified random** sampling design, using variable sized sampling strata. Stratum I contains 90 units, Strata II and IV contain 80 units each, and Stratum III contains 70 units. Twelve sample units were chosen for possible excavation in Strata I-III by means of a table of random numbers, and eight units were chosen in the same manner for Stratum IV (Figure 1-3). Excavations resulted in digging seven randomly selected units in Stratum I, two in Stratum II, and six in Strata III and IV (Figure 1-4). However, these units were not excavated in the order of their selection (indicated by numbers in Figure 1-3). The excavated random units make up 9.4% of the non-housepit strata.

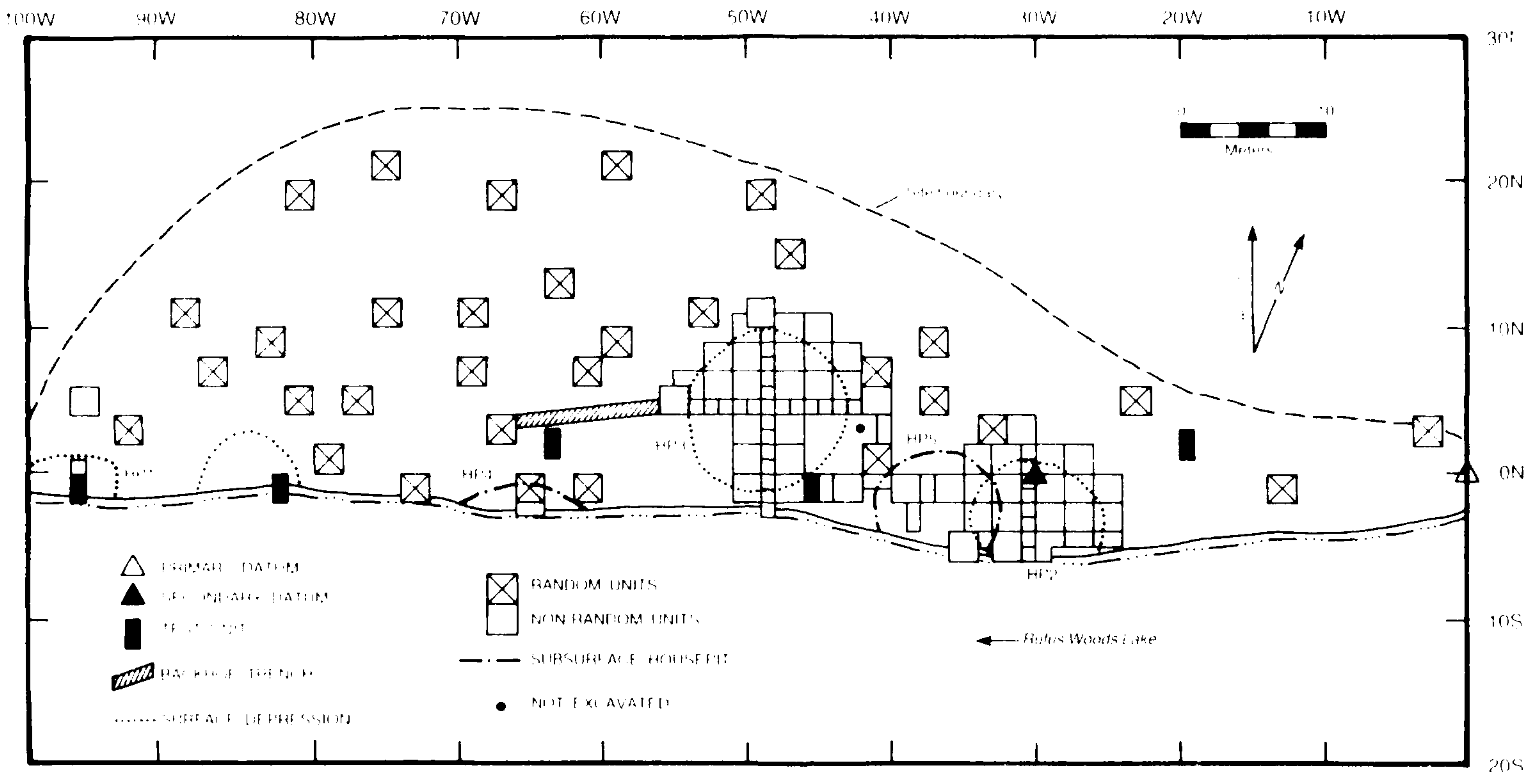


Figure 1-4. Excavated units, 45-OK-258.

Several purposive units also were dug in the non-housepit strata. One 2 x 2-m unit was placed just north of housepit Stratum A to investigate the stratigraphy in this area. A 1 x 2-m unit was placed just south of Unit 0N66W because this probabilistic sampling unit uncovered the remains of a partially eroded, buried housepit. Four 2 x 2-m units, three 1 x 2-m units, and two 1 x 1-m units were dug in Stratum I as part of the investigation of Housepits 2 and 3 (Figure 1-4), but these units are, of course, also purposive units in the context of the non-housepit stata. In addition, two randomly selected units (marked X and Y on Figure 2-4) were dug east of the site proper to investigate stratigraphic problems along the east side of the narrow terrace that contains the site. At the conclusion of excavations, a 1-m wide trench was dug between Units 4N68W and 6N56W with a backhoe. This trench allowed Housepit 3 to be linked stratigraphically with a a deep, complex feature located in Unit 4N68W.

HOUSEPIT SAMPLING

After test excavations were completed four housepits were identified. These are contained in housepit Strata A-D. Another housepit had been found during investigation of the eroding bank, and it was included in Stratum D (Figure 1-3). Housepit 1 in Stratum A began with the removal of the fill of Test Pit 1 and the excavation of a 1 x 1-m unit abutting the test pit to the north. An inspection of the resultant profile and a review of the cultural materials from this unit and the test pit forced us to conclude that this was not a housepit but, rather, a severely eroded pit feature of undetermined nature. The very shallow surface depression in Stratum B was investigated by cutting back the bank. This revealed no structural feature; the depression was not investigated further.

The housepits in Strata C and D, labelled Housepits 2, 3, and 5, not only proved to be remains of domestic structures, but were also more complex than originally assumed. We excavated a north-south and an east-west 1-m wide trench in Housepit 3 by digging 25 adjoining 1 x 1-m units for stratigraphic control. A total of 22 2 x 2-m units, two 1 x 2-m units, and two 2 x 2-m units that include only three 1 x 1-m subunits, were excavated in and around this housepit. Several of these units are located in non-housepit Stratum I, and several more are situated just south of Stratum C in an area not covered by sampling strata (see Figure 1-4).

The surface depression of Housepit 2 was cut by a 1-m wide north-south trench containing six 1 x 1-m units. Fifteen 2 x 2-m units, five 1 x 2-m units, and one 1 x 1-m unit were placed to excavate all of Housepit 2 and to find the relationship between it and Housepit 5. Unfortunately, available time and resources did not permit us to excavate all of these units down to the sterile subsoil. Two more 2 x 2-m units and three 1 x 2-m units were dug to investigate part of Housepit 3 and to connect Housepits 2 and 3 to unravel stratigraphic problems.

All told, we excavated 33 units of 1 x 1-m units, seven 1 x 2-m units, 37 2 x 2-m units, and two units with three 1 x 1-m units each in and around housepit Strata A-D. Areal coverage of Strata C and D, discounting units outside these strata, is as follows. Stratum C encompasses 120 m2, of which 85 m2 were excavated for an areal coverage of 70.8%. Stratum D encloses approximately 98 m2, of which 76 m2 were excavated, for an areal coverage of 76.6%. The total site encompasses approximately 1,686 m2, of which 288 m2 were excavated, for an areal coverage of 17.1%.

Excavators recovered 39,901 stone artifacts, 401,144 whole and fragmented bones, 62,148 pieces of shell, and 13,079 fire-modified rocks. Within this assemblage are 581 worn and manufactured artifacts encompassing a range of lithic and non-lithic tools.

REPORT FORMAT

The following chapters present the results of investigations at 45-OK-258. Chapter 2 begins with a discussion of the geologic setting of the site; describes the procedures used to establish depositional units, and then defines them; then defines the cultural zones. Chapter 3 gives the results of three separate analyses--technological, functional, and stylistic--that were applied to the artifacts. Chapter 4 describes the faunal remains recovered from the site, and briefly discusses the inferences that may drawn from them regarding subsistence and the seasonality of occupations at the site. Chapter 5 describes botanical material found at the site; considers the inferences that might be drawn from them regarding prehistoric economics; and notes seasonally available species. Chapter 6 describes constituent features. Chapter 7 summarizes the site's cultural deposits, and makes inferences from them concerning the nature and chronology of cultural occupations; and then places these findings in the context of the region's previous archaeology.

2. SEDIMENTARY STRATIGRAPHY AND CULTURAL CHRONOLOGY

This chapter discusses the geologic setting of site 45-OK-258 with reference to local geologic history and describes the sedimentary history of the site itself in detail. Strata mapped during excavation are grouped into site-wide depositional units, which provide the basis for determining how deposition occurred and for correlating cultural materials among units. The second half of the chapter discusses the cultural strata or analytic zones defined within this framework.

GEOLOGIC SETTING

The Columbia River channel was established during the late Miocene when it was carved into the juncture of the Columbia River Basalts (Waterville Plateau) and the gneissic rock of the Colville Batholith (Okanogan Highlands). During the Pleistocene, the middle and northern reaches of the Columbia River drainage were overlain by ice sheets. The Okanogan Lobe of the Cordilleran ice sheet filled the upper canyon to the Grand Coulee, reaching its maximum extent between 13,000 and 14,500 years ago. By the time of the Glacier Peak ashfall (12,000-13,000 B.P.), the glacier had withdrawn to the Canadian border. The ice in the upper canyon wasted away earlier than that in the lower canyon, resulting in an ice dam that ponded the river waters. A thick deposit of glaciolacustrine sediments was laid down in the upper canyon. When the lower ice dam was finally breached, the Columbia River rapidly cut down through these lacustrine sediments, creating a deep, narrow valley with prominent terrace systems. The date of this downcutting is not known, but Fryxell (1973) notes that the process had begun by the time of the Glacier Peak ashfall. The presence of Mazama tephra in alluvial fans built onto the 1,000 ft terrace indicates that the river had reached this elevation sometime before 7000 B.P., and probably reached historic elevations shortly thereafter (Hibbert 1984).

Since this time, less dramatic depositional and erosional processes have shaped the local landscape: lateral migration, point bar and overbank deposition of the river, alluvial fan development, colluvial deposition, and aeolian deposition. There is little floodplain development in this narrow and incised valley but natural levees and abandoned channels do exist. Lateral migrations of the channel are recorded by the shape of the river, point bar formation, and erosional episodes preserved in site profiles.

Sediments in the project area consist primarily of alluvium laid down along the developing floodplains or of aeolian material. Colluvium and talus accumulate along the slopes of canyon walls, and small alluvial fans develop at the mouths of tributaries draining the steep slopes on either side of the river. Higher than the present river channel, and at some distance from it, lie the older, inactive floodplains. The active floodplains of the river have been inundated almost annually and entirely submerged twice during historic times. Their sediments consist primarily of silty loam or loamy sand overlying basal cobble gravels.

Site 45-OK-258 itself is located on the northern shore of a short river strait at approximately RM 576 (Figure 2-1). One quarter mile southwest of the site, channel gravel and alluvial fan debris, originating in Hopkins' Canyon, is in evidence. Stratigraphic investigations suggest, however, that this sediment material had little or no effect on the formation of the low river terrace in the site area. Nor were slope wash colluvium or network ephemeral stream alluvium significant depositional factor at 45-OK-258.

Save for the presence of several boulders up to one meter in diameter, there is little evidence of glacial drift in the basal terrace deposit. Most of the river terrace is composed of both lateral and vertical sediments deposited as the Columbia migrated and overflowed its banks in postglacial times. Thus the site contains a record of the lateral movement of the river as well as previous river levels. Although designated as a river edge terrace (Hibbert 1980), it constitutes part of the narrow Columbia River flood plain. It exhibits both the graded bedding sedimentary structure indicative of lateral migration and the silt and clay laminar bedding of overbank deposits.

PROCEDURES

The excavation of site 45-OK-258 began in 1978 before a stratigraphic crew was formed. Excavation halted in November 1978 and resumed in the Spring of 1979. From May through December, 1979, the full-time stratigraphic crew profiled 181 linear meters with an average depth of 2 meters per excavation unit.

A total of 84 units plus an 80-cm wide, 10-m long, back-hoe trench were excavated in 1978 and 1979 (Figure 2-2). This report, however, deals only with the excavation walls that remained open in 1979 from the 1978 Housepit 3 excavation; the 40 units opened in 1979; the back-hoe trench; and the cutbank profile which resulted from wall slumpage. Figure 2-2 shows the location of these profiled walls as well as the position of the nine areas selected for column sampling. Five of the nine columns have been analyzed at this time.

Reservoir level fluctuations have eroded much of the site on the southern bank. Sections of Housepits 2 and 5 and almost all of Housepit 4 have been destroyed. Even during excavation the reservoir undercut unconsolidated sand along the river bank and several walls collapsed before they could be profiled.

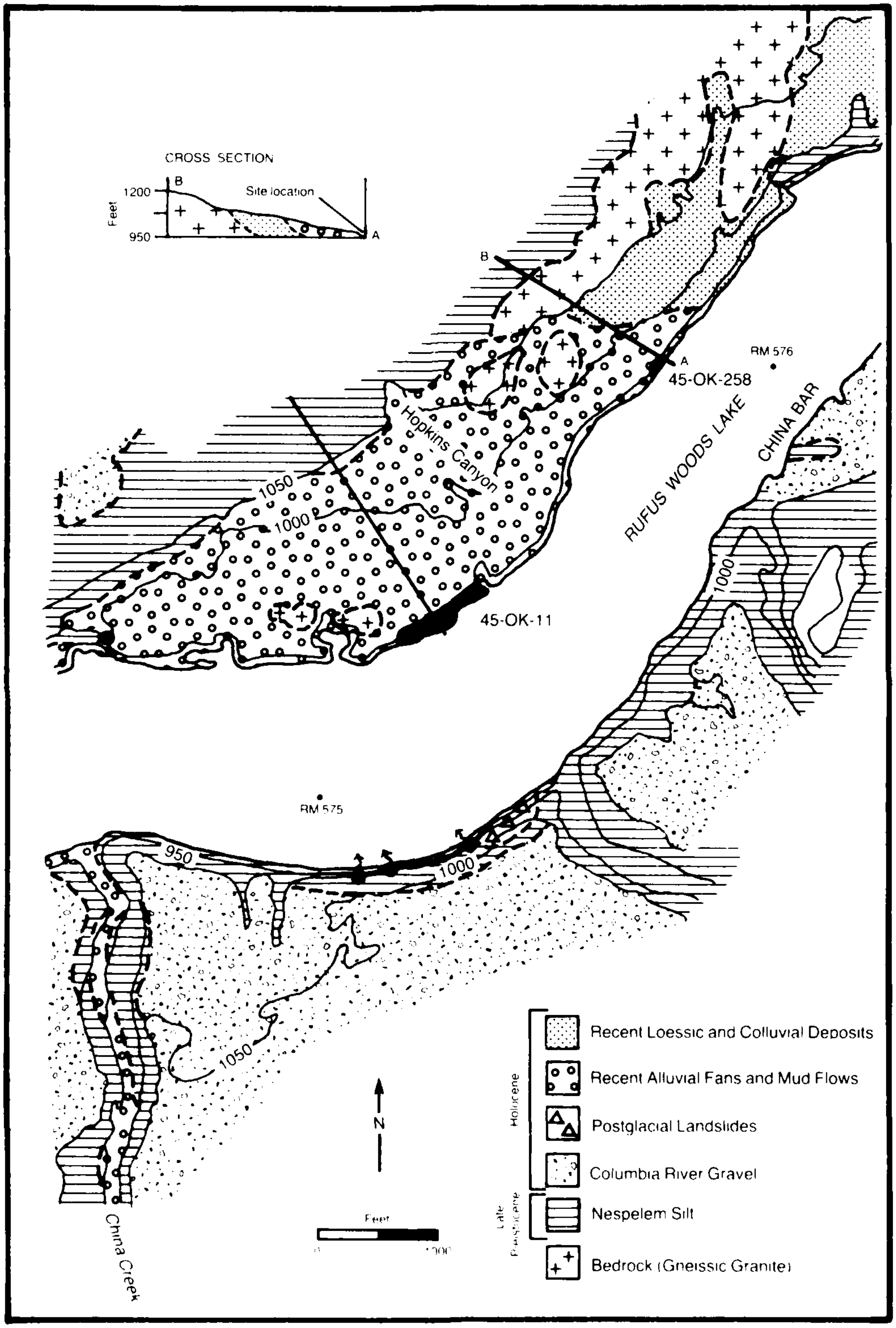


Figure 2-1. Geologic map of site vicinity, 45-OK-258.

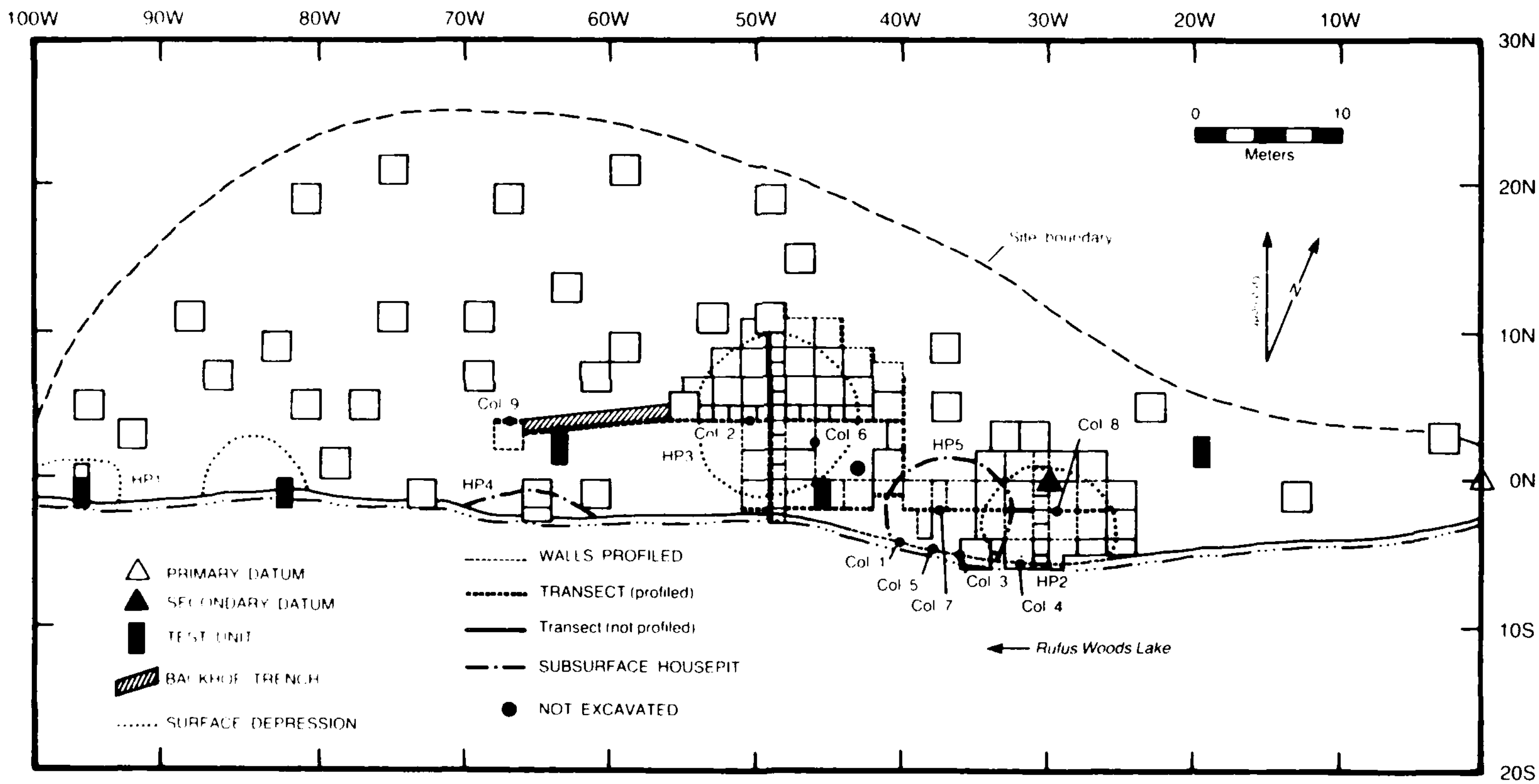


Figure 2-2. Location of column samples and stratigraphic transects, 45-OK-258.

Our analysis of sediment samples has determined to a large extent our construction of the natural and cultural depositional sequence. Following laboratory analysis, the main depositional strata were grouped and, when possible, interpreted on a sitewide basis. They formed the basis for the postulation of environment of deposition, sediment transport mechanisms, post-deposition alterations and, finally, for correlation of cultural materials among excavation units. Methods and procedures used in stratigraphic interpretation, sediment analysis and definition of analytic zones are described in the project's research design (Campbell 1984d).

DEPOSITIONAL HISTORY

Unlike a number of the archaeological sites in the project region where cultural activity scarcely altered the natural depositional sequence (e.g., 45-OK-287/288, 45-DO-243), the inhabitants at 45-OK-258 significantly modified the sediment profile. Prehistoric excavation for semi-subterranean dwelling structures and midden deposits left their mark on both the physical and chemical characteristics of the sediments. However, the units excavated north of Housepits 2 and 3 were only slightly disturbed by cultural activity and provide a record of natural deposition and transport mechanisms.

Housepit 3 and the adjacent area provides a model for much of the site's depositional history. This semi-subterranean dwelling feature is relatively intact; it exhibits a sequence of post-habitation depression fill; and no subsequent structures truncate or overlap the original housepit walls. In addition, the units excavated to its north, east and west contain most of the site's pre- and post-occupation depositional strata. Representative profiles of transects across the site from north to south and east to west, both inside and outside of housepits, have been drawn. Figure 2-2 shows the location of these transects, and Figures 2-3 through 2-6 present the transects.

Housepits 3 and 5 contained thin bands of overbank or slack water sediments. Vertical accretion, or overbank deposits, are the finest-sized material in a flood plain. The size distribution is variable, but all of the material is finer than medium sand (Lattman 1969:279). High flows do not necessarily mean high concentrations of material--the opposite is often observed. Record floods may only deposit about 1/8 in of material spread uniformly over the flooded area (Wolman and Leopold 1957:71). Vertical accretion, or overbank deposits, are the finest-sized material in a flood plain. The size distribution is variable, but all of the material is finer than medium sand (Lattman 1960:279).

Any evidence of levee development along the bank has been destroyed by the recent pool rise or by bank-caving that occurs when floods subside. During a flood's falling stages the convex bars receive their greatest deposits and build outward, causing the swifter water to hug the concave shore and undermine its toe.

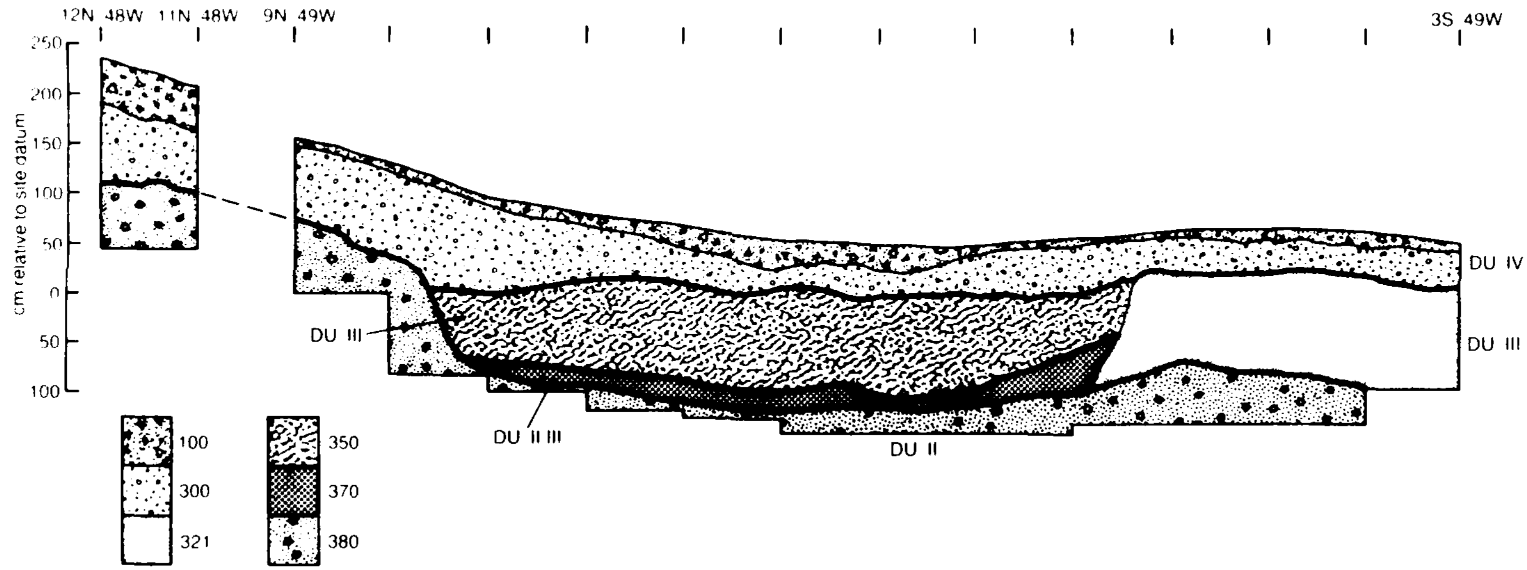


Figure 2-3. North-south stratigraphic transects through Housepit 3, 45-OK-258.

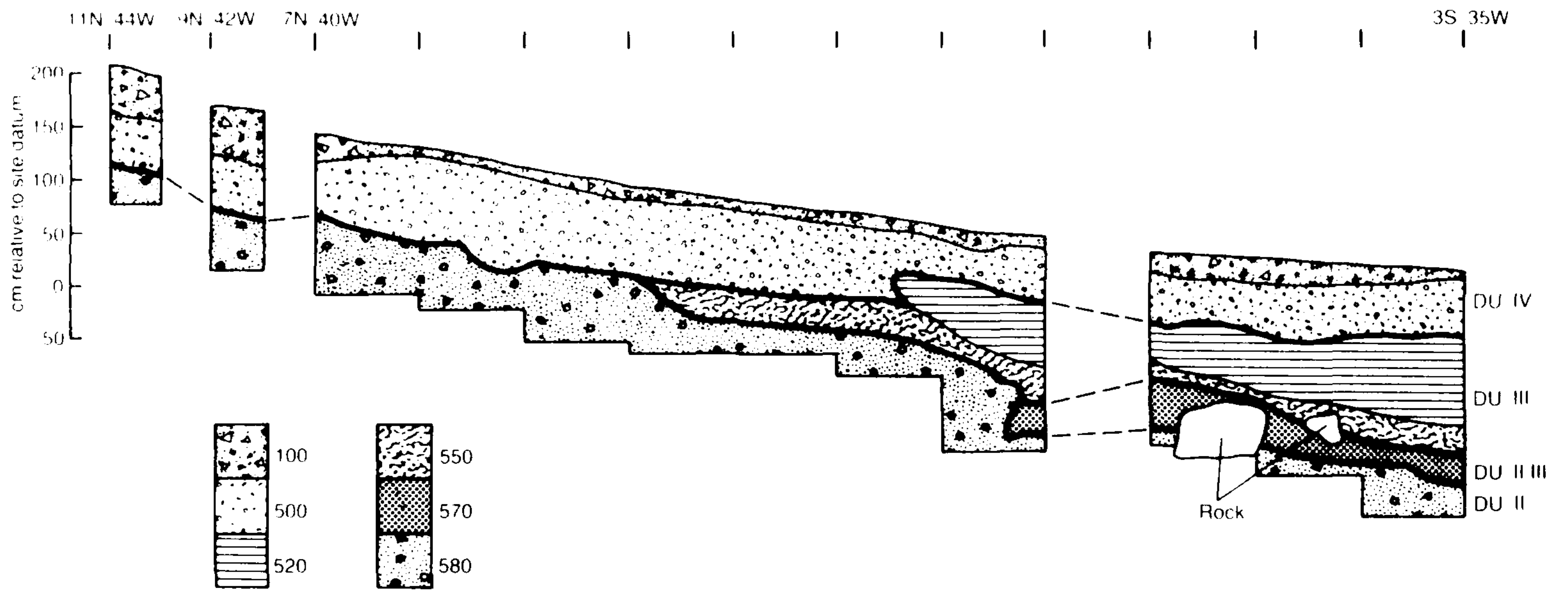


Figure 2-4. North-south stratigraphic transect east of Housepit 3 and through Housepit 5, 45-OK-258.

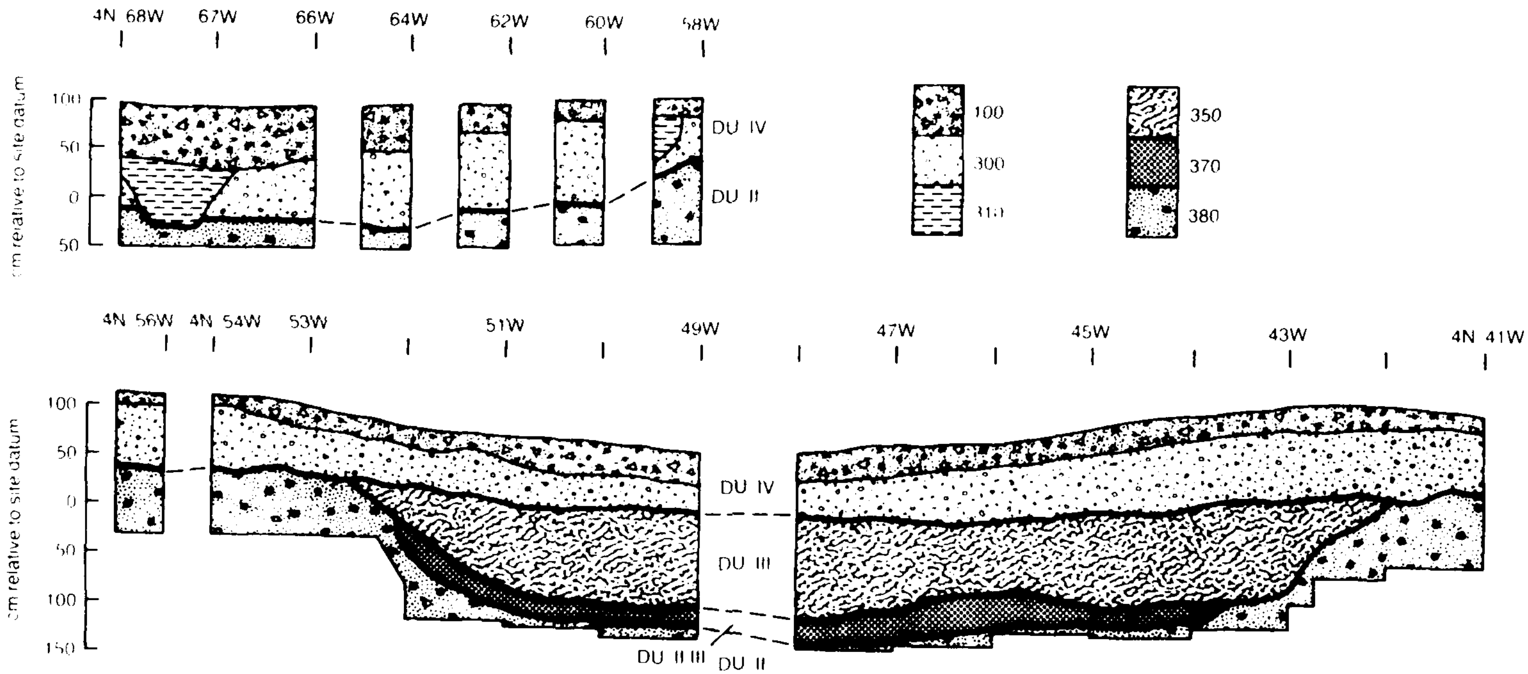


Figure 2-5. East-west trasect through Housepit 3 and to the west of Housepit 3, 45-OK-258.

Throughout the site's depositional history, wind erosion from level plains and aeolian deposition in depressions or against structures diffused stratigraphic boundaries and mixed sediments transported by wind and water. As the housepits were abandoned and structural material either decayed or was physically removed, wind-transported sediments, slack water sediments and rain splash or sheet wash material filled the existing depressions.

Because wind-modified alluvium and aeolian housepit depression fill occurred throughout the site, wind-deposited sediments were examined in detail. Prevailing winds from grid ESE transported sediments and deposited them in all existing depressions. The stratigraphic crew set up a sediment trap on the southeastern site limit. During periods of strong winds as much as 5 cm of coarse sand to silt-sized sediments would accumulate in a 24 hour period. Although wind is considered an excellent grain rounding agent, most of the trapped grains were subangular with pitted surfaces. Recent studies reveal this is not unusual; Goudie and Watson (1981) show that less than 15% of the wind-deposited quartz grains studied could be considered rounded or well rounded. In this region, it appears that the river was more influential as a rounding agent than wind.

The depositional history of 45-OK-258 consists of a number of sitewide strata interrupted only by the housepit features. Only four transporting agents, excluding man, are responsible for the site's natural profile. We have thus divided that profile into four depositional units, DU I, II, III, IV (Table 2-1). Taking into account such culturally deposited or culturally altered strata as living floors and house rims, nine major depositional levels are encountered. Housepit 3 was the first structure to be occupied according to adiocarbon age estimates, even though earlier dates were obtained from non-housepit levels west of site grid 80W. Housepit 5 may have adjoined Housepit 2 or was constructed shortly thereafter and Housepit 3 was probably contemporaneous with Housepit 5. We have assigned stratum numbers to indicate in which housepit they occur and how they correlate with other strata, e.g., Stratum 221 is in Housepit 2 and correlates with Straum 321 in Housepit 3. Only four transporting agents, excluding man, are responsible for the site's natural profile. We have thus divided that profile into four depositional units, DU I, II, III, and IV (Table 2-1).

DU I

Evidence of the oldest sediment at the site consists of the few scattered boulders of ice-contact stratified till (glacial drift). Large streams from melting ice deposited these boulders. Big as they were, subsequent flooding or channel bank migration could not transport them further. Most associated glacial drift or till material, however, was carried off by the Columbia River before the site was initially occupied. The channel bank alluvi um which now surrounds the boulders (Stratum 381) is actually part of DU II.

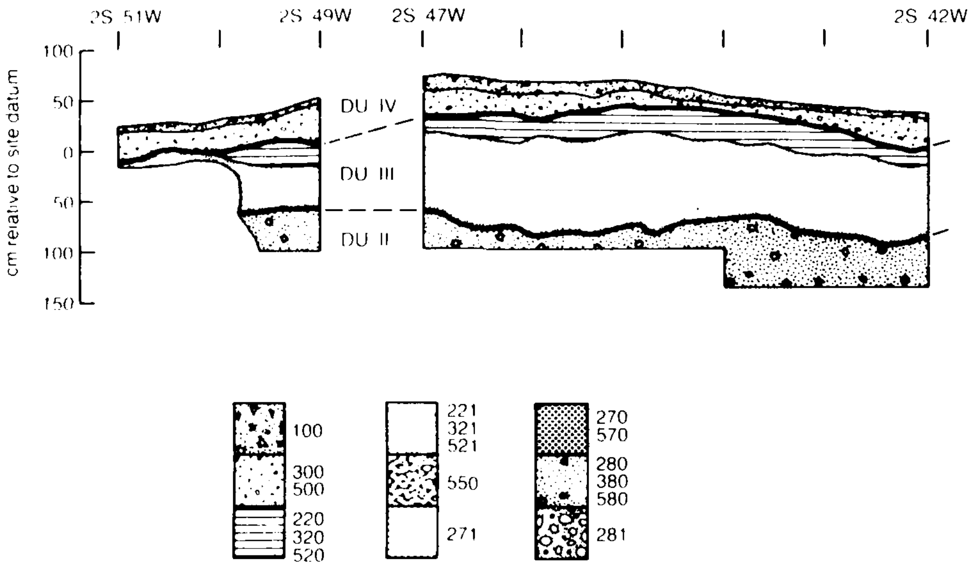


Figure 2-6. East-west stratigraphic transect of Housepits 3 and 5, 45-OK-258.

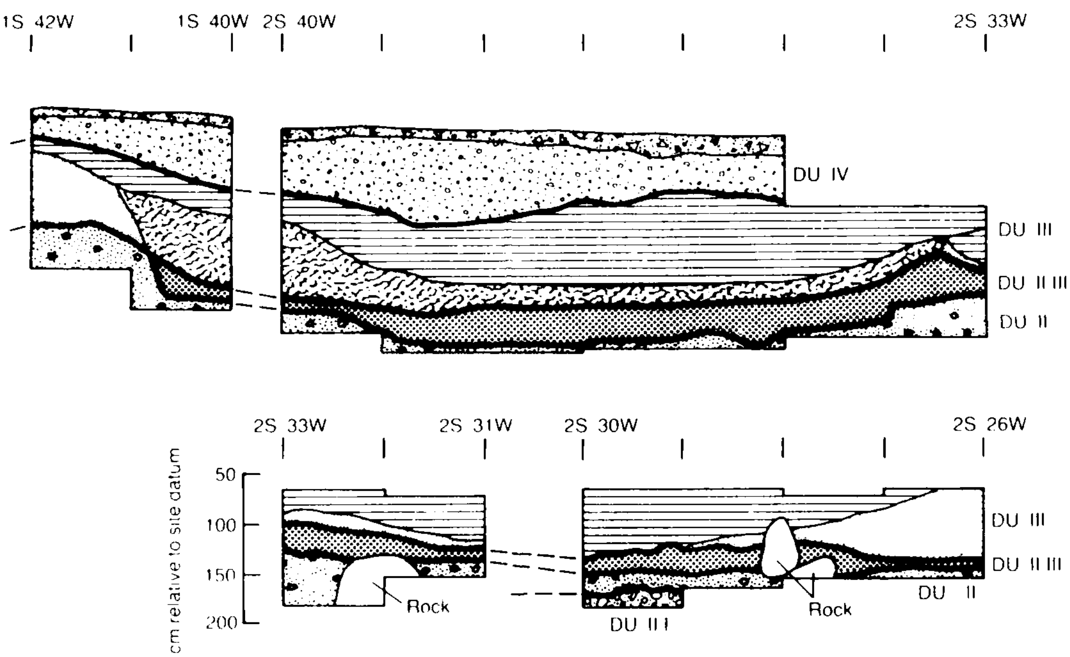


Figure 2-6. Cont'd.

Table 2-1. Summary of depositional units, 45-OK-258.

DU	Stratum	Description
IV		Aeolian deposit with some rain splash/slope wash deposits. Upper few cm consist of surface litter mat.
	100	Brown to pale brown (10YR5/3-6/3) dry, and dark grayish brown to brown (10YR4/2-5/3) moist sand to sandy loam; soft, angular blocky to granular structure.
	200 300 500	Brown to light brownish gray (10YR5/3-6/2) dry, and dark grayish brown to brown (10YR4/2-5/3) moist sand to sandy loam; soft, granular structure.
III		River deposited alluvium, vertical accretion. Laminar beds of fine slackwater sediments with clearest evidence in housepit depressions.
	210 310	Light grayish brown (10YR6) dry, and grayish brown (10YR5/2) moist loamy sand; soft (dry), firm (moist). Cultural pit features.
	220 320 520	Grayish brown to pale brown (10YR5/2-6/3) dry, and grayish brown to brown (10YR5/2-5/3) moist loamy sand to sandy loam; soft (dry), moderately well sorted. Much cultural modification.
	221 321 521	Grayish brown to pale brown (10YR5/2-6/3) dry, and grayish brown to brown (10YR5/2-5/3) moist loamy sand to sandy loam; firm (moist).
	271 350 550	Grayish brown to pale brown (10YR5/2-6/3) dry, and grayish brown to brown (10YR5/2-5/3) moist loamy sand to sandy loam; firm (moist). Culturally modified.
III/II		Living floors of first housepit occupants with heavy carbon staining. Exhibit characteristics of both DU II and III.
	270 370 570	Brown to pale brown (10YR5/3-6/3) dry, and dark grayish brown to brown (10Y?4/2-5/3) moist sand to loamy sand with occasional gravel; hard to firm (moist).
II		Graded beds of river rounded pebbles and sand deposited through lateral accretion.
	280 380 580	Pale brown to light gray (10YR6/3-7/2) dry, and pale brown (10YR6/3) moist sand to sandy loam with gravel and pebbles; loose, unconsolidated, poorly sorted.
II/I		Basal glacial drift deposit of large boulders (DU I) mixed with channel bank alluvium (DU II).
	281	Light brownish gray (2.5Y6/2) moist sand with scattered boulders; firm to loose (moist).

DU II

The next oldest depositional unit, DU II is made up of graded beds of river rounded pebbles and sand. These were carried by the meandering river in its lateral migration and were deposited along the riverbank, resulting in lateral accretion. Variable in thickness, this stratum of unconsolidated material ranges from basal coarse sediments to finer sands. It forms the foundation for occupation at the site. In this unit occurs the site's earliest cultural evidence; we surmise that at least portions of the landform were available for occupation more than 3,500 years ago.

DU III

This unit also contains river-deposited alluvium but represents vertical rather than lateral accretion. These laminar beds of fine slack water sediments are not in evidence sitewide. We found the clearest sign of these sediments in the depressions of Housepits 3 and 5. Grain morphology indicates that aeolian material influenced the sediment profile to such an extent that in areas outside the depressions little evidence remains of the original slack water deposit. Rodents and human activities further diffused the stratum boundaries.

DU IV

The upper unit includes the very thin surface organic litter mat as well as the thicker deposits of aeolian and some rain splash/wash sediments. Wind-deposited material increased once the landform stabilized and occupation became permanent. The grain morphology of samples from this DU is very similar to that of the samples collected in the sediment trap.

PHYSICAL AND CHEMICAL ANALYSIS OF COLUMN SAMPLES

Samples from five of the nine columns have been analyzed. At least one column was collected from each housepit area; all columns contain natural as well as cultural deposits.

Generally, the analytic results corroborate in-field stratigraphic interpretations of stratum boundary designations. The comparison of sample attributes from this site with those from undisturbed samples (e.g., 45-DO-243) confirms the heavy cultural influences on site deposits. Both trampling and chemicals deposited by occupation have affected the size and shape of the particles. Although there were fewer angular grains in the samples than at most sites, we observed a discernible change from the upper aeolian material to the lower alluvium. Wind-deposited grains were predominantly subangular and pitted while the stream-deposited material was subrounded to rounded with a clean, glossy surface.

Housepit 3 (Column #6) revealed the most conclusive evidence for post housepit abandonment. Samples 9 through 12, which include the slack water sediment (Sample #10), show a substantial decrease in calcium p.p.m.; the grains are predominantly angular compared to the overlying and underlying culturally altered samples. Although calcium results are relatively higher in Column 5 from Housepit 5, an overall drop in p.p.m. in Samples 13 through 18 suggests this was also a period of abandonment following housepit occupation.

Although cultural staining is at least partly responsible for the samples, we can still observe a marked change from grayish browns to grays as the channel bank alluvium is encountered. We are able to trace the migration of the channel bank prior to occupation by noting the lateral and vertical patterns of the lighter colored sediments from north to south.

CULTURAL STRATIGRAPHY

Cultural materials were recovered from DU II, the second oldest depositional unit, through DU IV, the most recent deposit. Because strata were not easily distinguished in the field excavation was in arbitrary levels referenced to grid unit and site datums. Artifact frequency counts were tabulated in the laboratory by these 5-10 cm arbitrary levels and 1 x 1-m and 2 x 2-m areal units of provenience. We identified analytic zones by correlating peak artifact frequency distributions with defined cultural and natural features. Radiocarbon dates and diagnostic artifacts were used to check these determinations. Often, lines drawn for analytic zones coincided with those drawn for natural strata; cultural factors, however, took precedence over natural divisions.

It must be emphasized that analytic zones are arbitrary constructs that may include a large cut of complex site stratigraphy, particularly in areas where repeated housepit construction took place. Analytic zones do not represent a single, circumscribed occupation limited to one interval of time.

In defining analytic zones, we relied upon the stratigraphic information collected in 1979, and did not use the earlier non-comparable stratigraphic information. We inspected block excavations in the site areas of Housepits 2, 3, and 5 first, and defined zones for these blocks. Then we zoned all surrounding excavation units that were investigated by the stratigraphy crew. Finally, we tied the zones together across all site areas where this was possible. In the following chapters site areas (Figure 2-7) are treated separately where this is necessary to compare and contrast housepits with each other. Site Area 1 includes all units that could not be zoned because they were widely scattered and had not been stratigraphically analyzed. Areas 2, 3, 4 and 5 include the housepits with corresponding numbers and the units surrounding each housepit. Area 6 includes stratigraphically investigated excavation units north of Housepit 4, west of Housepit 3, and south and east of Area 1.

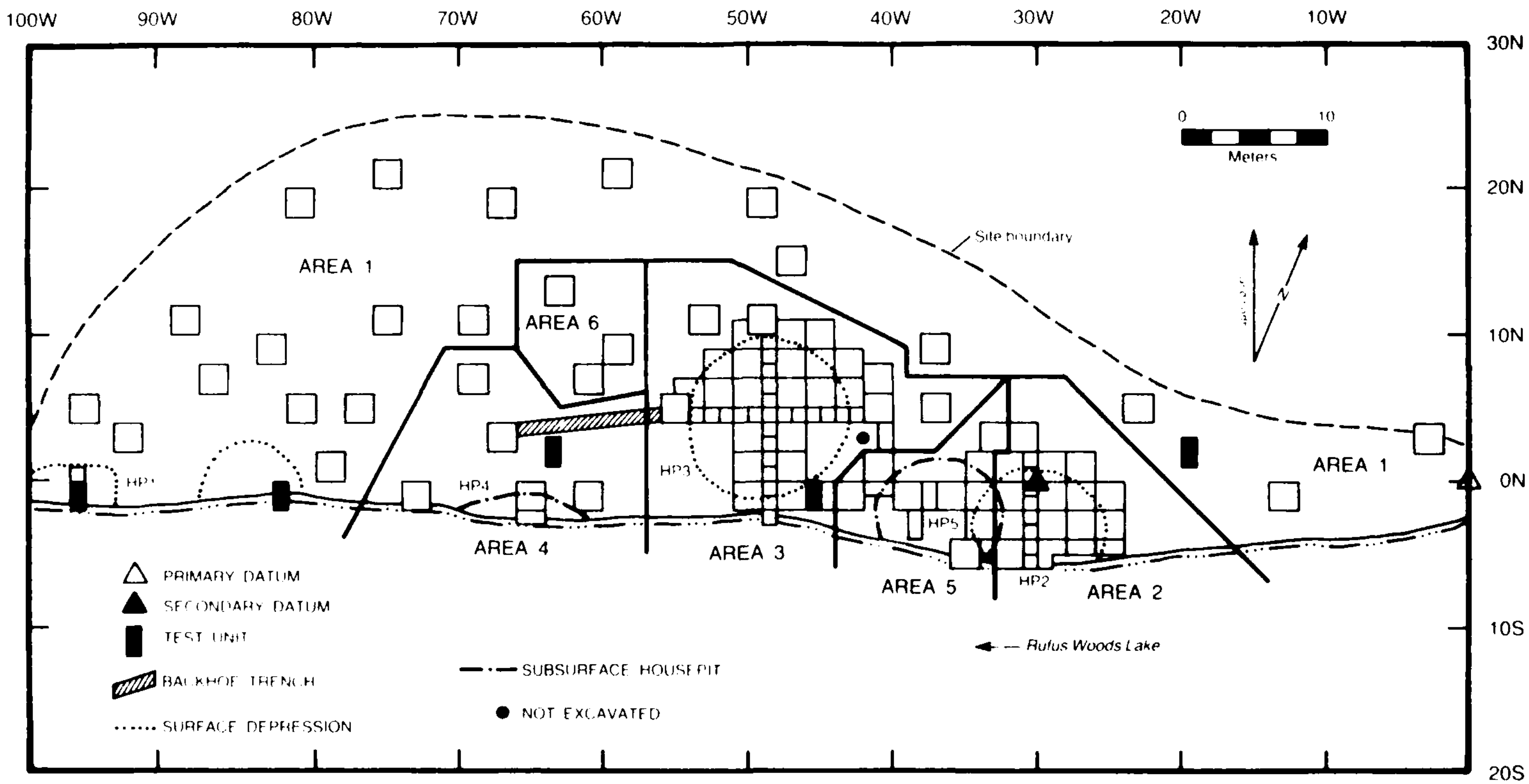


Figure 2-7. Site areas.

A total of six analytic zones have been identified at site 45-OK-258. Table 2-2 summarizes the relationship of the zones to the stratigraphic deposits and their associated radiocarbon dates and cultural material contents. This table also shows how the area-zones are assigned to the two components, a Hudnut Phase and a Coyote Creek Phase component.

ZONE 6

The oldest cultural zone defined at the site is associated with Strata 280/580 of DU II, the channel bank accretion. The zone is located in adjoining Areas 2 and 5, near the eastern margin of the site. A radiocarbon determination dates the zone to approximately 3570 B.P. Features are absent, and the low number of artifacts per cubic meter of matrix is similar to that of the uppermost zone, Zone 1, which also lacks housepits and features.

ZONE 5

This zone also is associated with Strata 280/380/580, and with Strata 370/270/570 and 380/550 of DU II, the channel bank accretion. It is located in Areas 2 and 5, in the southern part of Area 3, and the southeastern part of Area 6. It is absent from Area 4. Three radiocarbon dates place it between 3000-2750 B.P. It contained fourteen features, including a floor of Housepit 5. Artifact density per cubic meter of matrix is very high.

ZONE 4

This zone is associated with Strata 270/370/570 of DU II and Stratum 271 and 350/550 of DU III, the slack water deposits that followed the channel bank accretions. In several parts of the site, where the transition from DU II to DU III is relatively distinct, much of this zone appears to be situated at the top of DU II. In other site areas, however, the stratigraphic picture is much less clear. Zone 4 is present in all site areas. Five radiocarbon assays date it from 3300-2300 B.P. This time span overlaps both the preceding Zone 5 and the following Zone 3. The two oldest dates from this zone (3311$\pm$81 B.P. and 2925$\pm$103 B.P.) are from Area 6, north of grid line 6N and west of grid line 60W. Zoning here is based on diagnostic artifacts and geological strata, but the dates indicate that the area was also occupied during the Zone 5 site occupation. However, Zones 4 and 5 could not be separated here. Two more dates (2324$\pm$125 B.P., TX-3385; and 2851$\pm$103 B.P., B-4299), including the earliest in the zone, are from the same floor of Housepit 3. They are from two different areas of the house floor, and the earlier of the two dates was recovered stratigraphically higher than the later date. The older date may be explained by postulating that this charcoal represents an inner core of an old tree, but this does not entirely remove the difficulties inherent in the Zone 4 dates.

Table 2-2. The analytic zones of 45-OK-258: their stratigraphic definition, radiocarbon dates, and contents.

Zone	DU	Strata	Type of Deposit	Radiocarbon Dates[1] (years B.P.)	Lithic Artifacts N	Nonlithic Artifacts N	Bone N grams	Shell N[2] grams	FMR N grams	Hist/Misc N	Total N	# Features N	Volume (m^3)	Density (objects per M^3)
1	IV	100,200 300,500	Aeolian with some slope wash	Modern	5,137	22	19,864 6,269	1,435 3,902	1,388	18	27,864	-	815.5	34.2
2	IV[3], III	220,300, 320,321, 500,520		559±57 631±78 802±58	13,120	107	141,546 49,586	9,609 22,690	4,237	41	168,660	16	829.6	203.3
3	III	220,221, 320,321, 350,520, 521	Overbank deposits	2408±152 2455±126	9,049	79	67,285 19,949	21,122 45,782	3,297	26	100,858	23	983.6	102.5
4	III[3], II	270,271, 350,370, 550,570		2324±125 2562±145 2851±103 2925±103 3311±81	6,226	63	91,849 24,492	14,083 30,332	2,114	37	114,372	16	472.5	242.1
5	II	270,280, 370,380, 570,580	Channel bank accretion	2787±103 2878±216 2951±107	3,213	104	72,482 26,022	10,728 28,147	1,135	14	87,675	14	499.4	175.6
6	II	280,580	Channel bank accretion	3571±78	374	2	804 358	345 961	42	1	1,568	-	53.7	29.2
Unassigned		-	-	2763±235 2951±107 3054±232 3899±491	2,782	19	13,326 3,392	4,826 11,996	866	11	21,830	1	1,228.3	17.8
1-2	Coyote Creek Component			800 B.P.-Modern	18,257	129	161,410 55,855	11,044 26,592	5,625	59	196,524	16	1,645.4	119.4
3 6	Hudnut Component			3600-2400 B.P.	18,862	248	232,419 70,821	46,278 105,222	6,588	78	304,473	53	2,009.2	151.5
Total					38,901	396	407,155 130,068	62,148 143,810	13,079	148	522,827	70	4,882.9	107.1

[1] See Appendix A for additional information.
[2] Number of hinges.
[3] Zones 2 and 4 straddle boundaries between depositional units.

Zone 4 yielded sixteen features, including one floor in each of Housepits 3 and 5. Artifact density per cubic meter of matrix is highest of all zones on this site. This high density may be ascribed to two causes. First, the zone is located, at least in part, on the stabilized surface of DU II. Second, intense occupations of two house floors are a contributing factor.

ZONE 3

This zone is associated with Strata 350, 220/320/520, and 221/321/521 of DU III, the overbank deposits. It is found in all site areas. Two radiocarbon assays place it to 2400-2450 B.P. The 23 analysed features, highest in any zone, include the partial floor of Housepit 4. Artifact density per cubic meter of matrix is relatively high for the site as a whole, but it is lowest among the zones that include housepit floors.

ZONE 2

This zone is associated with Strata 300/500 of DU IV and Strata 220/520 and 321 of DU III. The zone occurs primarily on the surface of DU III, the overbank deposit, and occurs in all site areas. Three radiocarbon assays place it securely between 800-550 B.P. The 16 analysed features include the floor of Housepit 2. Artifact density per cubic meter of matrix is relatively high. This high density may be attributed to the occurrence of Zone 2 on the stabilized surface of DU III.

ZONE 1

The most recent cultural zone at the site is located in Strata 100/200/300/500 of DU IV, the aeolian deposition that also includes some slope wash. The cultural materials were buried beneath the present-day organic mat and surface litter, and an inspection of the ground surface yielded but few artifacts brought to the surface by burrowing animals. This zone is found in all areas except Area 6. One radiocarbon sample from Housepit 2 was too recent to yield a date. Horse bones found in the Housepit 3 area and this recent date suggest that this last occupation dates to the ethnohistoric, or contact, period. No features were found, and the artifact density is similar to that from Zone 6, another non-housepit occupation.

UNASSIGNED (ZONES 0 AND 9)

These are not, technically, analytic zones, but serve as convenience categories to subsume units that could not be zoned. Zone 9 includes all units from Area 1 (Figure 2-7) that could not be zoned because they were excavated before a full-time stratigraphic analysis crew joined the project. The average artifact density is 10.3 per cubic meter, making zoning even more difficult. Zone 0 consists of unit levels that exhibit severe mixing

characteristics, such as diagnostic artifacts from both components and matrix characteristics that indicate that these materials were severely disturbed by the prehistoric occupants of the site. These levels are primarily found around the northern rim of Housepit 5, but they also occur in the immediate vicinity of the other housepits. The average artifact density for this zone is 45.7 objects per cubic meter of matrix. This density is slightly higher than that for zones without housepits, but still much below densities of zones with housepits.

Both zones combined include only one cultural feature, which is located near the western site boundary. It was too far from the zoned site portion to be included in a zone. The combined artifact density for both zones is 17.7 objects per cubic meter of matrix. Four radiocarbon dates from these zones range from 3900-2750 B.P. Three of these fall into the time span indicated for Zone 5, but the oldest date is more than 300 years older than the date for Zone 6. Charcoal for this oldest date, however, was recovered from Level 50 of Unit 1S83W, which is rather close to the surface. In comparison, a date 800 years more recent was recovered from Level 110 in a unit 14 m directly west of the older date's provenience. These difficulties could not be resolved, given the methods of sampling and excavation. For comparative purposes, we will include the cultural materials from these two zones in the technological and functional analyses of Chapter 3. Because only 4.2 percent of the total number of artifacts from all zones are in Zones 0 and 9, the analyses are not invalidated by these unassignable cultural materials.

SUMMARY

The oldest sediments at the site consist of a few scattered boulders and some glacial drift material low in porosity and permeability, probably deposited by turbulent, postglacial waters. Lateral accretion started before the earliest site occupation that probably occurred around 3500 BP. This channel bank accretion apparently terminated around 2500 B.P., but by then the first housepit of Zone 5 had been occupied. The relatively dense cultural materials of this zone are incorporated in the channel bank matrix.

The resulting surface was then used for one of the most intensive site occupations, that of Zone 4. Around 2400 B.P., an episode of overbank deposits, or vertical sediment accretion, occurred. The site was occupied at this time, resulting in the cultural deposit of Zone 3. The lower four zones, then, all occurred from 3500-2400 B.P. This time span falls into the Hudnut Phase, defined for the project area. Diagnostic artifacts support this phase assignment (see Chapter 3). Because of the relatively short time span involved and the difficulties with the dating of Zone 4, Zones 6-3 have been combined into a single component representing the Hudnut Phase at the site.

The site appears to have been unoccupied from 2400 B.P. to 800 B.P. At that time, the primary occupation of Zone 2, including housepits, took place on the stabilized surface of the overbank deposits. The last cultural episode, Zone 1, occurred while aeolian deposits, mixed with some slope wash

from the slope behind the site, were accumulating. This occupation, dated to approximately 150-100 years B.P. based on the presence of horse bones together with a late lithic assemblage, terminated before the aeolian deposition was completed. The last two cultural zones have been combined into a single component, representing the Coyote Creek Phase at the site (Table 2-2).

3. ARTIFACT ANALYSES

This chapter presents data on the artifacts recovered from 45-OK-258, followed by analyses of their manufacture and use. The artifacts have been subjected to two separate analyses: technological and functional. **Technological analysis** describes elements of manufacture with emphasis on identification of raw materials and lithic reduction sequences. Functional analysis focuses on attributes of manufacture and wear in order to make inferences about the use of tools. In addition, stylistic analyses are presented for the projectile points and cobble tools from this site. The projectile points from the assemblage have been classified according to attributes of form that have demonstrable temporal and/or spatial significance. By combining these attributes, types can be formed that can then be related to types established in other regions on the Columbia Plateau. A separate cobble tool classification is included here which was developed after the original functional sorting and classification had been completed. Taken together, these three analyses provide a basic description of the artifacts collected at the site and highlight points of research interest. They also serve as a guide to the data available in the project's computerized data base. Detailed descriptions of analytic procedures are included in the *project's research design* (Campbell 1984d).

Data recovery at 45-OK-258 yielded 522,827 artifacts. Analysis of artifact frequencies and stratigraphic data resulted in the identification of six analytic zones (see Chapter 2). The excavated volume per zone and the number of artifacts per cubic meter vary greatly between zones (see Table 2-2). Zones 2 through 5, with housepit features, yielded 103-242 artifacts per cubic meter of matrix. The highest artifact densities, over 200 per cubic meter, were recovered from the two zones that occurred, at least in part, on surfaces that were stabilized for extended periods of time. Zones 6 and 1, without housepits, 29-34 artifacts, and the unassigned units and levels averaged only 18 artifacts per cubic meter of matrix.

The artifact assemblage is divided into lithics (including less than 1/4 inch flakes), bone, shell and fire-modified rock. The distribution of these groups by zone and component has been shown in Table 2-2. The following analyses only apply to lithics, less than 1/4 inch flakes, and bone tools. All other materials have been counted, weighed where applicable, and stored.

TECHNOLOGICAL ASSEMBLAGE

Technological analysis of artifacts from this site involves five dimensions of classification: **object type, material, condition, dorsal topography** and **treatment.** The attributes of **length, width, thickness,** and **weight** supplement the five primary dimensions. Only object type (where applicable), material, and dorsal topography (presence or absence of cortex) are discussed in this section along with length, width, and thickness.

All lithic objects except unmodified flakes and chunks were given **formal type** names during functional analysis. These names are based on traditionally accepted terms, rather than on functional analysis of manufacture and/or wear patterns on the objects. All data presented below, in this and the following sections, are sorted according to the formal type designations.

The data are presented by component rather than by the finer zones for reasons given in Chapter 2. The unassigned materials (Zones 0 and 9) are also presented to indicate how these data compare with those from the components and to show the type of data that are available from the site for further analysis.

Table 3-1 summarizes lithic formal types by component, providing basic background information for comparison with information about lithic industries. For easier reference and comparison, formal types are subdivided into four groups: formed objects; modified objects, including worn and/or manufactured objects that are not formed; miscellaneous objects; and debitage. Comparison of Tables 2-2 and 3-1 shows that percentages of analyzed artifacts per component differ. In the Coyote Creek component, 7.9% of the component total shown in Table 2-2 was analyzed and in the Hudnut component, 5.3% of the total assemblage was analysed. Of the non-assigned materials, 10.9% was analysed. The remainder of the materials in each component consists of bone, shell, FMR, non-lithics and miscellaneous materials, including historic artifacts.

Table 3-2 shows the frequencies of material types by component. There are 20 different lithic materials, as well as the separate categories of bone/antler, shell, dentalium, olivella, wood, ocher, and indeterminate materials. Objects made of jasper comprise almost one-half of the total assemblage. Cryptocrystalline (CCS) materials, including jasper, chalcedony, petrified wood, and opal, make up slightly over 80% of all artifacts, and quartzite objects comprise an additional 15%. CCS and quartzite, then, make up all but five percent of the total assemblage.

In the following discussion, a number of the lithic types are combined into groups. Jasper, chalcedony, petrified wood, and opal are discussed togehter as "cryptocrystalline material" (CCS) because they occur naturally in the same, or very similar, geologic environments and they fracture in the same manner. Basalt and fine-grained basalt are grouped together for the same reason. Quartzite, fine-grained quartzite, basalt (including fine-grained basalt), granitic, and obsidian objects are considered separately because of their different fracturing characteristics. Silicified mudstone, argillite,

Table 3-1. Formal object types by component, 45-OK-258. Includes less than 1/4-in flakes; less than 1/8-in flakes excluded.

Formal Type Group	Formal Type	Coyote Creek Component		Hudnut Component		Unassigned		Total	
		N	%	N	%	N	%	N	%
Formed Objects	Projectile point	69	0.4	68	0.4	11	0.4	148	0.4
	Projectile point base	32	0.2	21	0.1	5	0.2	58	0.1
	Projectile point tip	54	0.3	45	0.2	3	0.1	102	0.3
	Biface	74	0.4	60	0.3	7	0.3	141	0.4
	Burin	3	<0.1	-	-	-	-	3	<0.1
	Chopper	13	0.1	18	0.1	5	0.2	36	0.1
	Drill	12	0.1	10	0.1	4	0.1	26	0.1
	Graver	13	0.1	9	<0.1	3	0.1	25	0.1
	Pestle	-	-	1	<0.1	-	-	1	<0.1
	Scraper	9	<0.1	26	0.1	4	0.1	39	0.1
	Tabular knife	95	0.5	134	0.7	22	0.8	251	0.6
	Bead	5	<0.1	15	0.1	-	-	20	0.1
	Pipe	1	<0.1	-	-	-	-	1	<0.1
	Amorphously flaked object	1	<0.1	1	<0.1	-	-	2	<0.1
	Subtotal	381	2.1	408	2.2	64	2.3	853	2.4
Modified Objects	Anvil	-	-	1	<0.1	-	-	1	<0.1
	Edge ground cobble	2	<0.1	3	<0.1	-	-	5	<0.1
	Hammerstone	32	0.2	53	0.3	5	0.2	90	0.2
	Maul	-	-	3	<0.1	-	-	3	<0.1
	Hopper mortar base	5	<0.1	14	0.1	1	<0.1	20	0.1
	Peripherally flaked cobble	-	-	5	<0.1	-	-	5	<0.1
	Blade	4	<0.1	1	<0.1	1	<0.1	6	<0.1
	Small linear flake	58	0.3	39	0.2	7	0.3	104	0.3
	Unifacially retouched object	56	0.3	41	0.2	4	0.1	101	0.3
	Bifacially retouched object	49	0.3	46	0.2	7	0.3	102	0.3
	Utilized only object	256	1.4	222	1.2	62	2.2	540	1.4
	Subtotal	462	2.5	428	2.3	87	3.1	977	2.4
Miscellaneous Objects	Burin spall	2	<0.1	-	-	-	-	2	<0.1
	Weathered object	16	0.1	7	<0.1	5	0.2	28	0.1
	Core	25	0.1	22	0.1	10	0.4	57	0.1
	Resharpening flake	14	0.1	17	0.1	4	0.1	35	0.1
	Indeterminate object	35	0.2	64	0.3	8	0.3	107	0.3
	Subtotal	92	0.5	110	0.6	27	1.0	229	0.6
Debitage	Conchoidal flake	14,182	77.5	13,555	71.8	2,055	73.6	29,792	74.5
	Tabular flake	1,870	10.2	2,756	14.6	319	11.4	4,945	12.4
	Chunk	1,316	7.2	1,633	8.6	242	8.7	3,191	8.0
	Subtotal	17,368	94.9	17,944	95.0	2,616	93.6	37,928	94.9
Total	N	18,303		18,890		2,794		39,987	
	Row %	45.8		47.2		7.0			

Table 3-2. Material type frequencies by component, 45-OK-258.

Material Type		Coyote Creek Component	Hudnut Component	Unassigned	Total
Jasper	N	8,770	9,119	1,620	19,509
	Col %	47.5	47.5	57.6	48.2
Chalcedony	N	5,411	2,597	306	8,314
	Col %	29.3	13.5	10.9	20.6
Petrified wood	N	8	33	3	44
	Col %	<0.1	0.2	0.1	0.1
Obsidian	N	18	25	4	47
	Col %	0.1	0.1	0.1	0.1
Opal	N	1,357	2,898	373	4,628
	Col %	7.4	15.1	13.3	11.4
Quartzite	N	2,217	3,327	385	5,929
	Col %	12.0	17.3	13.7	14.7
Fine-grained quartzite	N	146	138	17	301
	Col %	0.8	0.7	0.6	0.7
Basalt	N	113	165	18	296
	Col %	0.6	0.9	0.6	0.7
Fine-grained basalt	N	94	311	28	433
	Col %	0.5	1.6	1.0	1.1
Silicized mudstone	N	8	8	3	19
	Col %	<0.1	<0.1	0.1	<0.1
Argillite	N	38	90	15	143
	Col %	0.2	0.5	0.5	0.4
Granitic material	N	46	92	4	142
	Col %	0.2	0.5	0.1	0.4
Sandstone	N	3	2	1	6
	Col %	<0.1	<0.1	<0.1	<0.1
Nephrite	N	1	2	-	3
	Col %	<0.1	<0.1	-	<0.1

Table 3-2. Cont'd.

Material Type		Coyote Creek Component	Hudnut Component	Unassigned	Total
Siltstone/ mudstone	N	12	36	2	50
	Col %	0.1	0.2	0.1	0.1
Steatite	N	2	3	-	5
	Col %	<0.1	<0.1	-	<0.1
Schist	N	7	9	-	16
	Col %	<0.1	<0.1	-	<0.1
Shale	N	5	6	3	14
	Col %	<0.1	<0.1	0.1	<0.1
Quartz	N	1	-	-	1
	Col %	<0.1	-	-	<0.1
Graphite/ molybdenite	N	-	1	-	1
	Col %	-	<0.1	-	<0.1
Bone/antler	N	88	148	12	248
	Col %	0.5	0.8	0.4	0.6
Shell	N	-	6	1	7
	Col %	-	<0.1	<0.1	<0.1
Dentalium	N	-	1	-	1
	Col %	-	<0.1	-	<0.1
Olivella	N	-	3	1	4
	Col %	-	<0.1	<0.1	<0.1
Wood	N	2	1	-	3
	Col %	<0.1	<0.1	-	<0.1
Ocher	N	39	89	5	133
	Col %	0.2	0.5	0.2	0.3
Indeterminate/ miscellaneous	N	59	78	11	148
	Col %	0.3	0.4	0.4	0.4
Total		18,445	19,188	2,812	40,445

sandstone, nephrite, silt/mudstone, steatite, schist, shale, and quartz fine-grained red sandstone, and indeterminate lithic objects are grouped as "other" in this report because they occur in very small frequencies at this site.

Table 3-3 summarizes the occurrence of the grouped material types by component. A chi-square determination between the numbers of CCS and quartzite objects, and CCS and basalt objects, and quartzite and basalt objects in the Hudnut and Coyote Creek components demonstrate that the differences between these three groups are due to causes other than chance on the 0.995 level of confidence. Explanations for the differing frequencies remain to be sought. Other materials have not been subjected to the same statistical tests because relative frequencies between zones are too similar to give statistically meaningful variation.

Table 3-3. Grouped material type frequencies by component, 45-OK-258. Excludes less than 1/4-in flakes.

Material Type		Coyote Creek Component	Hudnut Component	Unassigned	Total
CCS	N	12,938	12,875	2,073	27,886
	Col %	83.3	76.0	81.5	79.6
Quartzite	N	2,124	3,221	382	5,727
	Col %	13.7	19.0	15.0	16.4
Fine-grained basalt	N	135	132	17	284
	Col %	0.9	0.8	0.7	0.8
Basalt	N	194	447	44	685
	Col%	1.2	2.6	1.7	2.0
Granitic material	N	46	92	4	142
	Col %	0.3	0.5	0.2	0.4
Obsidian	N	15	21	3	39
	Col %	0.1	0.1	0.1	0.1
Other lithics	N	75	149	21	245
	Col %	0.5	0.9	0.8	0.7
Total		15,527	16,937	2,544	35,008

Table 3-4 presents artifact formal type by material group and by component. Flakes less than 1/8 inch have been excluded because their collection depended on soil conditions and excavator bias; most of them fell through the 1/8-in mesh of the screens. Although flakes less than 1/4 inch were not subjected to the total technological analysis, they are discussed later in analysis and so are included here. The artifacts are listed in four groups: formed objects, objects that have been modified through use or by core preparation, miscellaneous objects that do not fit readily into the remaining groups, and debitage that shows no wear or further manufacturing modification.

Table 3-4. Formal object types by material by component, 45-OK-258. Includes less than 1/4-in flakes; less than 1/8-in flakes excluded.

Material Group	Formal Type Group	Formal Type	Coyote Creek Component	Hudnut Component	Unassigned	Total
Cryptocrystalline	Formed objects	Projectile point	67	60	11	138
		Projectile point base	29	17	2	48
		Projectile point tip	53	42	3	98
		Biface	73	56	5	134
		Burin	3	-	-	3
		Chopper	1	-	-	1
		Drill	12	10	3	25
		Graver	12	8	3	23
		Scraper	9	26	3	38
		Tabular knife	2	1	2	5
		Bead	-	2	-	2
	Subtotal	N	261	222	32	515
		Col %	1.7	1.5	1.4	1.6
	Modified objects	Blade	3	1	1	5
		Small linear flake	58	39	7	104
		Unifacially retouched object	49	35	4	88
		Bifacially retouched object	46	46	6	98
		Utilized only object	251	215	59	525
	Subtotal	N	407	336	77	820
		Col %	2.6	2.3	3.3	2.5
	Miscellaneous objects	Burin spall	2	-	-	2
		Weathered object	8	1	4	13
		Core	25	22	10	57
		Resharpening flake	14	13	3	30
		Indeterminate object	2	3	1	6
	Subtotal	N	51	39	18	108
		Col %	0.3	0.3	0.8	0.3
	Debitage	Conchoidal flake	13,757	12,797	1,964	28,518
		Tabular flake	1	3	-	4
		Chunk	1,060	1,206	211	2,477
	Subtotal	N	14,818	14,006	2,175	30,999
		Col %	95.4	95.9	94.5	95.6
	Total		15,537	14,603	2,302	32,442
Quartzite	Formed objects	Projectile point base	1	-	-	1
		Biface	-	1	-	1
		Chopper	2	3	4	9
		Tabular knife	88	130	19	237
		Amorphously flaked object	-	1	-	1
	Subtotal	N	91	135	23	249
		Col %	4.1	4.1	6.0	4.2
	Modified objects	Edge-ground cobble	1	1	-	2
		Hammerstone	5	9	-	14
		Unifacially retouched object	1	-	-	1
		Bifacially retouched object	2	-	-	2
		Utilized only object	1	3	2	6
	Subtotal	N	10	13	2	25
		Col %	0.5	0.4	0.5	0.4
	Miscellaneous objects	Weathered object	6	2	1	9
		Resharpening flake	-	-	1	1
		Indeterminate object	-	1	-	1
	Subtotal	N	6	3	2	11
		Col %	0.3	0.1	0.5	0.2
	Debitage	Conchoidal flake	119	125	18	262
		Tabular flake	1,803	2,698	314	4,815
		Chunk	188	348	26	562
	Subtotal	N	2,110	3,171	358	5,639
		Col %	95.2	95.5	93.0	95.2
	Total		2,217	3,322	385	5,924

Table 3-4. Cont'd.

Material Group	Formal Type Group	Formal Type	Coyote Creek Component	Hudnut Component	Unassigned	Total
Fine-grained Quartzite	Formed objects	Projectile point tip	-	1	-	1
		Chopper	1	2	-	3
		Tabular knife	3	1	-	4
		Amorphously flaked object	1	-	-	1
	Subtotal	N	5	4	-	9
		Col %	3.4	2.9	-	3.0
	Modified objects	Edge-ground cobble	1	1	-	2
		Unifacially retouched object	1	1	-	2
	Subtotal	N	2	2	-	4
		Col %	1.4	1.4	-	1.3
	Debitage	Conchoidal flake	64	83	12	159
		Tabular flake	58	31	5	94
		Chunk	17	18	-	35
	Subtotal	N	139	132	17	288
		Col %	95.2	95.7	100.0	95.7
	Total		146	138	17	301
Basalt	Formed objects	Projectile point	1	7	-	8
		Projectile point base	2	3	1	6
		Projectile point tip	1	1	-	2
		Biface	-	2	1	3
		Chopper	7	7	1	15
		Graver	1	-	-	1
		Tabular knife	1	1	-	2
		Bead	1	4	-	5
	Subtotal	N	14	25	3	42
		Col %	6.8	5.3	6.5	5.8
	Modified object	Edge-ground cobble	-	1	-	1
		Hammerstone	8	13	-	21
		Maul	-	2	-	2
		Hopper mortar base	2	-	-	2
		Peripherally flaked cobble	-	1	-	1
		Unifacially retouched object	2	5	-	7
		Bifacially retouched object	1	-	-	1
		Utilized only object	3	-	-	3
	Subtotal	N	16	22	-	38
		Col %	7.8	4.6	-	5.2
	Miscellaneous	Indeterminate object	1	5	-	6
	Subtotal	N	1	5	-	6
		Col %	0.5	1.1	-	0.8
	Debitage	Conchoidal flake	155	396	42	593
		Tabular flake	-	5	-	5
		Chunk	20	22	1	43
	Subtotal	N	175	423	43	641
		Col %	85.0	89.1	93.5	88.2
	Total		206	475	46	727
Granitic Material	Formed objects	Chopper	2	6	-	8
		Pestle	-	1	-	1
		Tabular knife	2	1	-	3
	Subtotal	N	4	8	-	12
		Col %	8.9	8.7	-	8.5
	Modified objects	Anvil	-	1	-	1
		Hammerstone	16	29	1	46
		Maul	-	1	-	1
		Hopper mortar base	3	14	1	18
		Peripherally flaked cobble	-	4	-	4
		Unfacially retouched object	1	-	-	1
		Utilized only object	-	1	-	1

Table 3-4. Cont'd.

Material Group	Formal Type Group	Formal Type		Coyote Creek Component	Hudnut Component	Unassigned	Total
Granitic Material (continued)	Subtotal		N	20	50	2	72
			Col %	43.5	54.3	50.0	50.7
	Miscellaneous objects	Weathered object		1	-	-	1
		Indeterminate object		1	2	1	4
	Subtotal		N	2	2	1	5
			Col %	4.3	2.2	25.0	3.5
	Debitage	Conchoidal flake		14	18	1	33
		Tabular flake		-	6	-	6
		Chunk		6	8	-	14
	Subtotal		N	20	32	1	53
			Col %	43.5	34.8	25.0	37.3
	Total			46	92	4	142
Obsidian	Formed objects	Drill		-	-	1	1
	Subtotal		N	-	-	1	1
			Col %	-	-	25.0	2.2
	Modified object	Blade		1	-	-	1
		Bifacially retouched object		-	-	1	1
	Subtotal		N	1	-	1	2
			Col %	5.0	-	25.0	4.3
	Miscellaneous objects	Weathered object		-	1	-	1
	Subtotal		N	-	1	-	1
			Col %	-	4.0	-	2.2
	Debitage	Chonchoidal flake		12	24	1	37
		Chunk		4	-	1	5
	Subtotal		N	16	24	2	42
			Col %	94.1	96.0	50.0	91.3
	Total			17	25	4	46
Other and Indeterminate Lithics	Formed objects	Projectile point		1	1	-	2
		Projectile point base		-	1	2	3
		Projectile point tip		-	1	-	1
		Biface		1	1	1	3
		Graver		-	1	-	1
		Scraper		-	-	1	1
		Bead		4	9	-	13
		Pipe		1	-	-	1
	Subtotal		N	7	14	4	25
			Col %	5.2	6.0	11.4	6.2
	Modified objects	Hammerstone		3	2	4	9
		Unifacially retouched object		2	-	-	2
		Utilized only object		1	3	1	5
	Subtotal		N	6	5	5	16
			Col %	4.4	2.1	14.3	4.0
	Miscellaneous	Weathered object		1	3	-	4
		Resharpening flake		-	4	-	4
		Indeterminate object		31	53	6	90
	Subtotal		N	32	60	6	98
			Col %	23.7	25.5	17.1	24.2
	Debitage	Conchoidal flake		61	112	17	190
		Tabular flake		8	13	-	21
		Chunk		21	31	3	55
	Subtotal		N	90	156	20	266
			Col %	66.7	66.4	57.1	65.7
	Total			135	235	35	405

Weathered objects in the miscellaneous group exhibit rounding and polishing of the surface, probably caused by water or wind erosion.

CCS artifacts comprise slightly more than 80% of the total assemblage. Within this industry, formed objects are present in low relative frequencies when compared to other industries, even though the absolute frequencies of CCS formed objects are high. Among modified objects, the relative frequency of CCS is intermediate between the two quartzite industries, which have low relative frequencies, and the remaining industries, which have higher relative frequencies. CCS modified objects consist of blades, small linear flakes and the various retouched and modified objects, as would be expected given the fracturing characteristics of the material. Relative frequencies of CCS miscellaneous objects and debitage are similar to those of most other lithic industries at the site.

Quartzite objects make up approximately 15% of the site's lithic assemblage. Although relative frequencies of formed objects are high, this is due almost entirely to tabular knives. Because quartzite fractures tabularly, almost 95% of all tabular knives are quartzite. Modified objects made of quartzite occur in low relative frequencies. However, slightly over 15% of all hammerstones are quartzite. Among miscellaneous objects, quartzite weathered objects predominate, comprising one-third of all weathered objects. This may be explained by postulating that the prehistoric inhabitants of the site picked up discarded quartzite tools at the edge of the river, where they were searching for quartzite cobbles to use as raw material. The relative frequency of quartzite debitage is similar to that of almost all other industries, but over 97% of all tabular flakes are quartzite, again due to the rock's tabular fracturing characteristics.

Numbers of objects made of fine-grained quartzite are too small to warrant comparisons. The assemblage comprises less than 1% of all lithics. Despite the small sample size, however, the relative frequency of debitage resembles that of most other industries. Moreover, the material appears to fracture somewhat like regular quartzite as the number of tabular flakes indicates.

Comprising almost 2% of the assemblage, basalt is the third most frequent material type. The relative frequency of formed objects is comparatively high; many different types of formed objects are made from basalt. One formal type, however, predominates: slightly over 40% of all choppers are basalt. Modified objects follow the same pattern. Here, over 23% of all hammerstones are made of basalt. The relative frequency of debitage is a little lower than that for the three previously discussed industries. This is probably due to the poorer flaking qualities imparted by the crystalline structure of basalt.

Granitic objects make up less than 0.5% of the lithic industry. Within the granite industry, modifed objects comprise about one-half of all objects. Of the modified objects, 23% of all hammerstones, 90% of all hopper mortar bases are granitic. The very low frequency of granitic debitage is due to the stone's nature: it does not exhibit conchoidal fracture and will crush or break into irregular chunks when struck.

Obsidian materials constitute only 0.1% of the lithic assemblage. It is nonetheless kept separate because it is an imported material and thus provides evidence of trade and data about the nature of traded raw material objects. It is interesting to note that the percentage frequencies in the total column are very similar to those of the other industries for all formal type groups. Frequencies of obsidian in components, of course, are too low to be compared.

The data listed under "other and indeterminate lithics" include the remaining lithic raw materials and lithic objects that could not be classified. Other lithics include silicified mudstone, argillite, sandstone, nephrite, hard silt and/or mudstone, steatite, schist, shale, quartz, and graphite and/or molybdenum (see also Table 3-2). Other and indeterminate lithics include a number of beads and objects of indeterminate formal type. The beads should be reanalysed to identify the raw material.

In summary, then, I would like to make the following observations. The CCS industry exhibits the highest diversity, in that 24 of the 33 listed formal types include at least one CCS object. Moreover, CCS projectile points, projectile point bases, bifaces, burins, drills, gravers, scrapers, blades and small linear flakes, bifacially retouched objects, utilized only objects, cores and conchoidal flakes comprise at least 90% of the total numbers of these objects in the whole assemblage. CCS then, forms the basis for the lithic industry at the site. All other industries appear to fulfill a more specialized function. Quartzite is represented in 16 of the 33 formal types. Tabular knives, hammerstones, and tabular flakes are the most frequent quartzite artifacts. Fine-grained quartzite is represented in only 9 of the 33 formal types; this industry does not appear to function for a special purpose. Basalt is present in 20 of the formal types; this is greater than the figure for quartzite, even though there are almost nine times as many quartzite objects. Heavy working implements--choppers and hammerstones--are the most numerous basalt artifacts. Granite occurs in 15 of the formal types, just one less than the figure for quartzite, although there 40 times as many quartzite as granitic objects. Granitic tools are also of a specialized variety: most of them are hammerstones and hopper mortar bases. The obsidian industry at 45-OK-258 is noteworthy because there is no evidence of special treatment of this imported material. The relative frequencies of debitage from the various industries indicate that all raw materials went through the complete manufacturing process at the site. However, additional data will be presented below to investigate the manufacturing process further.

Table 3-5 presents the kind of debitage by material and component. Primary debitage, defined as objects initially detached from a block or nodule of raw material, includes flakes with cortex and chunks. Cortex is the weathered surface of a nodule or block of raw material. Chunks are angular objects without striking platforms or bulbs of percussion that are detached from a block of raw material where it has cracked along planes of weakness. Secondary debitage includes all flakes without cortex that are not resharpening flakes and that are less than 1/4 inch. Flakes less than 1/4 inch are measured along the longest axis regardless of presence, absence, or

Table 3-5. Kinds of debitage by material and component, 45-OK-258.

Material[1] Type	Kind of[2] Debitage	Coyote Creek Component		Hudnut Component		Unassigned		Total	
		N	%[3]	N	%[3]	N	%[3]	N	%[3]
CCS	Secondary	10,993	90.0	10,777	87.8	1,698	87.3	23,468	88.8
	Primary	1,199	9.8	1,428	11.6	246	12.6	2,873	10.9
	Indeterminate	28	0.2	71	0.6	2	0.1	101	0.4
	Subtotal	12,220	82.5	12,276	87.6	1,946	89.5	26,442	85.3
	<1/4 in flakes	2,600	17.5	1,730	12.6	229	10.5	4,559	14.7
Quartzite	Secondary	1,251	62.0	1,997	65.0	200	56.3	3,448	63.4
	Primary	744	36.9	1,024	33.4	148	41.7	1,916	35.2
	Indeterminate	22	1.1	49	1.6	7	2.0	78	1.4
	Subtotal	2,017	95.6	3,070	96.8	355	99.2	5,442	96.5
	<1/4 in flakes	93	4.4	101	3.2	3	0.8	197	3.5
Fine-grained Quartzite	Secondary	93	72.7	81	64.3	14	82.4	188	69.4
	Primary	35	27.3	45	35.7	3	17.6	83	30.6
	Subtotal	128	92.1	126	95.5	17	100.0	271	94.1
	<1/4 in flakes	11	7.9	6	4.5	–	–	17	5.9
Basalt	Secondary	114	69.9	331	84.0	32	78.0	477	79.8
	Primary	49	30.1	62	15.7	8	19.5	119	19.9
	Indeterminate	–	–	1	0.3	1	2.4	2	0.3
	Subtotal	163	92.1	394	93.1	41	95.3	598	93.3
	<1/4 in flakes	12	6.9	29	6.9	2	4.7	43	6.7
Granitic material	Secondary	7	35.0	13	40.6	1	100.0	21	39.6
	Primary	13	65.0	19	59.4	–	–	32	60.4
	Subtotal	20	100.0	32	100.0	1	100.0	53	100.0
	<1/4 in flakes	–	–	–	–	–	–	–	–
Obsidian	Secondary	10	71.4	20	100.0	–	–	30	85.7
	Primary	4	28.6	–	–	1	100.0	5	14.3
	Subtotal	14	87.5	20	83.3	1	50.0	35	83.3
	<1/4 in flakes	2	12.5	4	16.7	1	50.0	7	16.7
Total		14,562		15,928		2,361		32,841	

[1]Indeterminate and other lithics not shown.
[2]Flakes 1/8 inch excluded.
[3]Column percent of primary, secondary, and indeterminate debitage based on subtotal; column percent of subtotal and >1/4 in flakes based on total of both (not given).

position of striking platforms and bulbs of percussion. Since tertiary debitage, defined as small flakes detached mostly through pressure flaking to produce a working edge, is not identified as such in our analysis, flakes smaller than 1/4 inch are presented as a rough substitute for this category. Indeterminate flakes are included here because their numbers modify percentages of primary and secondary flakes. This group is composed of flakes so broken or so small that presence or absence of cortex cannot be determined.

The percentage frequency of CCS primary debitage is relatively low while the relative frequency of less than 1/4 inch flakes is high in comparison with all other industries except obsidian (Table 3-5). Quartzite and fine-grained quartzite, on the other hand, have high frequencies of primary debitage and relatively low frequencies of small flakes. Frequencies of basalt primary and tertiary debitage fall between these two extremes. We assume that quartzite was readily available to site inhabitants in the form of river cobbles. Basalt also was available in the river gravels, and there are basalt outcrops at the southern rim of the Columbia River canyon. On the other hand, CCS raw material sources have not been found in the project area, and we assume that this material had to be carried to the site from several miles away. The low frequency of primary CCS detritus supports this assumption, because it shows that trimming of raw material nodules took place, for the most part, away from the site. Furthermore, the high relative frequency of small CCS flakes suggests that much secondary modification and finishing of CCS tools did take place at the site. The lower frequencies of quartzite and basalt small flakes is attributable to a factor we have already observed--that many tools made of these raw materials were used for heavy tasks. Fine cutting edges were not essential for this purpose, resulting in the production of fewer small flakes.

Absolute frequencies of granitic debitage are too low to be conclusively interpreted. However, the high proportion of premary debitage is consistent with the ready availability of granitic material in the bedrock surrounding the site.

It is surprising that the frequencies of kinds of obsidian debitage (the smallest assemblage in Table 3-5) are similar to that of CCS debitage. Especially noteworthy is the presence of primary obsidian debitage, indicating that unworked nodules of obsidian were transported to the site. However, the small number of flakes suggests that this may have been a singular occurrence.

Tables 3-6, 3-7, 3-8, and 3-9 present the average length, width, thickness, and weight of conchoidal flakes from the three components. Less than 1/4 inch flakes are excluded because they were not measured. CCS and obsidian flakes are smallest and weigh the least, and granitic flakes are the most massive. Quartzite, fine-grained quartzite and basalt flakes are intermediate in size and weight.

Much of the technological analysis is too general in nature to permit inferences about changes between components. Statistically significant differences are present, however, in the relative proportions of CCS, quartzite and basalt objects in the Coyote Creek and Hudnut Phase components (see Table 3-3). The percentage of CCS materials is greater in the later

Table 3-6. Average length (mm) of conchoidally flaked material by component, 45-OK-258.

Material	Statistic	Coyote Creek Component	Hudnut Component	Unassigned	Total
CCS	x̄	9.7	9.7	9.7	9.7
	s.d.	3.5	3.9	3.9	3.7
	N	6,025	5,801	1,001	12,827
Quartzite	x̄	17.1	20.0	20.7	18.7
	s.d.	15.8	18.8	15.4	17.2
	N	84	79	16	179
Fine-grained Quartzite	x̄	11.3	12.0	15.1	11.9
	s.d.	6.6	7.4	10.6	7.3
	N	41	25	7	73
Basalt	x̄	13.5	13.4	10.2	13.1
	s.d.	12.3	12.3	4.1	11.8
	N	71	144	20	235
Granitic Materials	x̄	34.9	33.2	11.0	32.8
	s.d.	35.9	38.1	-	35.4
	N	9	10	1	20
Obsidian	x̄	7.8	9.2	-	8.7
	s.d.	1.3	1.3	-	1.4
	N	5	8	-	13
Other Lithics	x̄	9.1	10.2	9.7	9.9
	s.d.	2.4	3.3	1.6	2.9
	N	16	39	6	61
Indeterminate Lithics	x̄	10.0	10.8	-	10.4
	s.d.	4.2	5.8	-	4.9
	N	9	9	-	18
Total	x̄	9.8	9.9	9.9	9.9
	s.d.	4.5	5.3	4.6	4.9
	N	6,260	6,115	1,051	13,426

Table 3-7. Average width (mm) of concholdally flaked material by component, 45-OK-258.

Material	Statistic	Coyote Creek Component	Hudnut Component	Unassigned	Total
CCS	x	8.3	8.9	8.5	8.6
	s.d.	16.3	33.7	4.9	24.9
	N	3,988	3,599	765	8,352
Quartzite	x	17.2	20.8	22.4	19.2
	s.d.	17.6	16.1	20.2	17.2
	N	57	49	12	118
Fine-gained Quartzite	x	11.5	11.3	13.0	11.6
	s.d.	7.1	5.3	7.7	6.5
	N	39	24	7	70
Basalt	x	16.1	13.8	12.6	14.4
	s.d.	18.0	12.7	7.5	14.1
	N	51	100	17	168
Granitic Materials	x	31.2	27.4	8.0	28.1
	s.d.	24.8	21.8	-	22.5
	N	8	9	1	18
Obsidian	x	7.8	7.0	-	7.4
	s.d.	2.2	1.6	-	1.8
	N	5	5	-	10
Other Lithics	x	9.2	10.4	7.0	10.0
	s.d.	4.1	3.4	-	3.6
	N	10	28	1	39
Indeterminate Lithics	x	8.1	12.8	-	10.3
	s.d.	3.2	12.5	-	9.0
	N	10	9	-	19
Total	x	8.6	9.3	8.9	8.9
	s.d.	16.4	32.9	5.8	24.5
	N	4,168	3,823	803	8,794

Table 3-8. Average thickness (.1mm) of conchoidally flaked material by component, 45-OK-258.

Material	Statistic	Coyote Creek Component	Hudnut Component	Unassigned	Total
CCS	x	16.7	19.6	19.3	18.2
	s.d.	11.0	100.2	11.6	66.3
	N	5,627	4,978	959	11,564
Quartzite	x	35.1	41.8	58.1	40.1
	s.d.	41.9	47.7	72.2	47.8
	N	76	75	14	165
Fine-grained Quartzite	x	25.5	30.1	39.2	28.4
	s.d.	24.9	25.5	47.1	27.4
	N	52	37	8	97
Basalt	x	31.7	26.1	26.5	27.8
	s.d.	55.1	31.7	36.2	40.1
	N	64	137	18	219
Granitic Materials	x	68.4	84.5	25.0	74.5
	s.d.	85.9	138.2	-	111.6
	N	10	11	1	22
Obsidian	x	18.1	13.0	-	15.7
	s.d.	8.3	5.2	-	7.3
	N	8	7	-	15
Other Lithics	x	15.9	15.1	46.2	16.8
	s.d.	12.2	7.7	50.3	14.7
	N	23	56	4	83
Indeterminate Lithics	x	16.8	23.1	-	19.8
	s.d.	5.9	14.9	-	11.3
	N	11	10	-	21
Total	x	17.3	20.2	20.2	18.8
	s.d.	14.1	97.6	16.4	65.4
	N	5,871	5,311	1,004	12,186

Table 3-9. Average weight (0.1 gm) of conchoidally flaked material by component, 45-OK-258.

Material	Statistic	Coyote Creek Component	Hudnut Component	Unassigned	Total
CCS	x	1.9	14.5	2.4	7.6
	s.d.	5.2	1,114.5	7.3	747.0
	N	8,484	8,051	1,388	17,923
Quartzite	x	57.5	75.2	118.6	70.6
	s.d.	236.1	410.6	377.8	339.5
	N	92	98	16	206
Fine-grained Quartzite	x	9.9	10.3	7.9	10.0
	s.d.	38.6	56.4	13.3	47.7
	N	59	81	12	152
Basalt	x	63.4	19.0	68.3	34.5
	s.d.	443.8	94.8	350.6	259.0
	N	116	291	34	441
Granitic Materials	x	290.9	9,877.3	1.0	5,374.6
	s.d.	956.6	39,172.8	-	28,567.7
	N	14	17	1	32
Obsidian	x	1.1	1.1	178.0	7.9
	s.d.	0.4	0.2	-	34.7
	N	8	17	1	26
Other Lithics	x	3.9	2.0	15.2	3.2
	s.d.	11.0	1.8	25.7	8.4
	N	37	72	5	114
Indeterminate Lithics	x	1.6	13.5	2.7	8.3
	s.d.	0.8	41.1	2.9	31.1
	N	19	28	3	50
Total	x	3.8	34.5	5.4	18.0
	s.d.	68.8	2,045.8	67.6	1,383.8
	N	8,829	8,655	1,460	18,944

Coyote Creek component, while the percentage of quartzite and basalt is less. The relative frequencies of the formal type groups within CCS are virtually identical between the two components, although the percentages of formed and modified objects are slightly higher in the more recent component, indicating that CCS objects were used slightly more intensively during the Coyote Creek Phase. Individual formal types with large sample sizes change in frequency, but no qualitative change is evident. Similarly, the relative frequencies of quartzite object types vary little between the components.

The greatest difference in object type composition of a material assemblage is in basalt. The relative frequencies of formed and modified objects are greater in the Coyote Creek component than in the Hudnut component and the percentage of debitage is less. This suggests that, although the number of basalt objects decreased significantly in relation to CCS objects, the intensity of use of these objects increased. Since basalt is abundantly available within a five mile radius of the site, we cannot attribute this to the unavailability of basalt. The low frequencies of the remaining raw material industries do not permit us to make any further inferences about changes in lithic manufacture over time.

FUNCTIONAL ASSEMBLAGE

Functional analysis of artifacts from site 45-OK-258 involves two kinds of dimensions--those specific object to the object and those specific to individual areas of wear. The first includes three dimensions: (1) **utilization/modification**; (2) **type of manufacture**; and (3) **manufacture disposition** (whether manufacture covers the entire artifact or only part of it). Seven dimensions describe wear areas on objects: (1) **condition of wear** (whether worn area on broken object is complete or partial; (2) **wear/manufacture relationship**; (3) **kind of wear**; (4) **location of wear on the object**; (5) **shape of worn area**; (6) **orientation of wear**; and (7) **edge angle.**

OBJECT SPECIFIC ANALYSIS

Of the object-specific dimensions, only utilization/modification and type of manufacture data are used in the following section. Table 3-10 shows the relationship between presence of wear/manufacture and type of manufacture for formed objects. In our analysis, manufacture has been defined as the shaping of an object for a specific function. All formed objects exhibiting manufacture at 45-OK-258 are either chipped, ground, pecked and ground, chipped, pecked and ground, or of indeterminate manufacture (Table 3-10). Several of the implements that we are terming "formed objects" with shapes manufactured for specific tasks were utilized for cutting, chopping, drilling, scoring, hammering, and scraping.

Table 3-11 presents the same information for modified objects other than formed objects. This table includes two kinds of objects: those defined on the basis of wear, like hammerstones, and retouched and utilized objects; and

Table 3-10. Wear/manufacture and type of manufacture of formed objects by component, 45-OK-258.

Formal Type	Wear/ Manufacture[1]	Type of Manufacture[2]	Coyote Creek Component	Hudnut Component	Unassigned	Total
Projectile point	3	2	59	60	9	128
	4	2	11	8	2	21
Projectile point base	3	2	32	17	4	53
	4	2	–	4	1	5
Projectile point tip	3	2	46	35	3	84
	4	2	8	10	–	18
Biface	2	1	1	–	–	1
	3	2	56	34	6	96
	4	2	17	26	1	44
Burin	4	2	3	–	–	3
Chopper	2	1	3	2	–	5
	3	2	4	7	3	14
	4	2	6	9	2	17
Drill	2	1	8	1	3	12
	3	2	1	–	–	1
	4	2	3	9	1	13
Graver	2	1	6	2	1	9
	4	2	7	7	2	16
Maul	2	1	–	1	–	1
	4	8	–	2	–	2
Pestle	4	7	–	1	–	1
Peripherally flaked cobble	3	2	–	4	–	4
	4	2	–	1	–	1
Scraper	2	1	–	1	–	1
	4	2	9	25	3	37
Tabular knife	2	1	1	1	–	2
	3	2	4	10	1	15
	4	2	91	122	21	234
	4	4	–	1	–	1
Bead	5	9	5	15	–	20
Pipe	5	9	1	–	–	1
Total			382	415	63	860

[1]Wear/manufacture:
1. None
2. Wear only
3. Manufacture only
4. Wear and manufacture
5. Indeterminate

[2]Type of Manufacture:
1. None
2. Chipping
4. Grinding
7. Pecking and grinding
8. Chipping, pecking, and grinding
9. Indeterminate/NA

Table 3-11. Wear/manufacture and type of manufacture of modified objects by component, 45-OK-258.

Formal Type	Wear/ Manufacture[1]	Type of Manufacture[2]	Coyote Creek Component	Hudnut Component	Unassigned	Total
Amorphously flaked object	4	2	1	1	-	2
Anvil	4	2	-	1	-	1
Edge ground cobble	5	9	1	2	-	3
Hammerstone	2	1	33	54	5	92
Hopper mortar base	2	1	4	11	1	16
	3	2	1	1	-	2
	4	2	-	1	-	1
	5	9	-	1	-	1
Burin spall	2	1	1	-	-	1
	4	2	1	-	-	1
Blade	1	1	2	1	1	4
	2	1	2	-	-	2
Small linear flake	1	1	54	39	7	100
	2	1	4	-	-	4
Core	1	1	19	18	6	63
	2	1	6	3	4	13
	3	2	-	1	-	1
Resharpening flake	2	1	2	1	-	3
	3	2	5	7	1	13
	4	2	7	9	3	19
Bifacially retouched flake	3	2	20	17	3	40
	4	2	29	30	4	63
Unifacially retouched flake	3	2	14	7	1	22
	4	2	41	33	3	77
Utilization flake/chunk	2	1	255	221	61	537
	4	2	3	2	-	5
	6	9	-	-	1	1
Indeterminate	2	1	-	1	-	1
	3	2	-	1	1	2
	4	2	-	1	-	1
	5	9	18	50	3	71
	6	9	1	-	-	1
Total			524	514	105	1,143

[1]Wear/manufacture:
1. None
2. Wear only
3. Manufacture only
4. Wear and manufacture
5. Modified/indeterminate
6. Indeterminate

[2]Type of Manufacture:
1. None
2. Chipping
9. Indeterminate

those defined on the basis of form, such as linear flakes, cores, and resharpening flakes. Approximately one-eighth of the modified objects exhibit neither wear nor manufacture.

Slightly more than 20% of the modified objects have been manufactured. Hammerstones, cores, utilized only objects, and linear flakes make up most of the nonmanufactured objects. Most implements of indeterminate formal type and all edge-ground cobbles exhibit manfacture of indeterminate type. All remaining manufactured objects are flaked; no other manufacturing type occurs. It should be noted that most of the nonmanufactured implements, such as linear flakes, cores, and utilized-only objects were produced by flaking. Hammerstones, on the other hand, are typically cobbles unmodified by manufacture. Hopper-mortar bases were probably selected, in part, for their shape and, thus did not require manufacture.

In the tool-specific analysis, each wear area on an object is treated separately. A pointed biface, for example, might have wear areas on its point and on one or more of its edges. If this wear is continuous from the point along the edge, it is treated as one wear area. If, however, wear areas are separated by an unworn stretch of edge, they are treated separately. Table 3-12 shows the number of wear areas on objects by formal category for formed objects. Ratios represent the average number of wear areas per object for each type. Formal types that include at least 15 implements with an average of more than two wear areas per object include scrapers, gravers, and drills. Tabular knives and choppers have at least one wear area per object, and bifaces, projectile points (including tips and bases), and beads exhibit fewer than one wear area per object.

Comparing ratios of each formal type between components shows that the number of wear areas per object decreases from the Hudnut component to the later Coyote Creek component for all types but projectile points. These differences in use are statistically insignificant for individual object types with the exception of bifaces. However, a chi-square statistical manipulation of the totals per component shows that the differences between components are due to causes other than chance at the 99.5% level of confidence. Therefore, it is suggested that use of formed objects decreased from the earlier Hudnut component to the end of the site's occupation.

Table 3-13 presents the same data for all modified objects other than formed objects. The ratios of formal types with more than 15 examples per type clearly fall into three groups. Hammerstones, unifacially retouched objects, and utilized only objects average more than 1.5 wear areas per object. Hopper-mortar bases and bifacially retouched objects average about one wear area per object, and resharpening flakes, cores, and linear flakes average fewer than one wear area per object.

A comparison of wear areas/object ratios between components shows that only two object types, unifacially retouched objects and hopper-mortar bases, have higher ratios in the Hudnut component, while all other object types have higher ratios of wear to objects in the Coyote Creek component. A chi-square statistical manipulation of the totals per component indicates that the

Table 3-12. Ratio of wear areas to objects for formed objects, 45-OK-258.

Formal Type	Number of Wear Areas per Object	Coyote Creek Component		Hudnut Component		Total
		Object Count	Wear Area/ Object	Object Count	Wear Area/ Object	Wear Area/ Object
Projectile point	0	58	15/69	60	11/68	26/137
	1	7	(0.22)	5	(0.16)	(0.19)
	2	4		3		
Projectile point base	0	32	0/32	17	5/21	5/53
	1	–	(0.00)	3	(0.24)	(0.09)
	2	–		1		
Projectile point tip	0	46	9/54	35	14/45	23/99
	1	7	(0.17)	6	(0.31)	(0.23)
	2	1		4		
Biface	0	57	27/74	34	40/60	67/134
	1	9	(0.36)	16	(0.67)	(0.50)
	2	6		8		
	3	2		1		
	5	–		1		
Burin	1	3	3/3	–	0/0	3/3
			(1.00)		(0.00)	(1.00)
Chopper	0	4	17/13	7	25/18	42/31
	1	3	(1.31)	4	(1.39)	(1.35)
	2	5		2		
	3	–		3		
	4	1		2		
Drill	0	1	22/12	–	23/10	45/22
	1	6	(1.83)	5	(2.30)	(2.05)
	2	2		1		
	3	2		1		
	4	–		2		
	5	–		1		
	6	1		–		
Graver	1	4	30/13	3	21/9	51/22
	2	3	(2.31)	–	(2.33)	(2.32)
	3	5		6		
	5	1		–		
Pestle	2	–	0/0	1	2/1	2/1
			(0.00)		(2.00)	(2.00)
Scraper	0	–	23/9	1	77/26	100/35
	1	1	(2.56)	2	(2.96)	(2.86)
	2	4		4		
	3	2		11		
	4	2		7		
	6	–		1		
Tabular knife	0	4	133/95	10	193/134	326/229
	1	61	(1.40)	77	(1.44)	(1.42)
	2	21		31		
	3	6		11		
	4	3		4		
	5	–		1		
Bead	0	5	0/5	15	0/15	0/20
			(0.00)		(0.00)	(0.00)
Pipe	0	1	0/1	–	0/0	0/1
			(0.00)		(0.00)	(0.00)
Amorphously flaked object	1	–	3/1	1	1/1	4/2
	3	1	(3.00)	–	(1.00)	(2.00)
Average ratio per component			282/381		412/408	694/789
			(0.74)		(1.01)	(0.88)

Table 3-13. Ratio of wear areas to objects for modified objects, 45-OK-258.

Formal Type	Number of Wear Areas per Object	Coyote Creek Component		Hudnut Component		Total
		Object Count	Wear Area/ Object	Object Count	Wear Area/ Object	Wear Area/ Object
Anvil	4	-	0/0	1	4/1	4/1
			(0.00)		(4.00)	(4.00)
Edge-ground cobble	0	1	0/1	1	6/2	6/3
	6	-	(0.00)	1	(3.00)	(2.00)
Hammerstone	1	16	60/33	30	84/52	144/85
	2	10	(1.82)	15	(1.62)	(1.69)
	3	5		5		
	4	1		1		
	5	1		1		
Hopper mortar base	0	1	4/5	2	15/13	19/18
	1	4	(0.80)	7	(1.15)	(1.06)
	2	-		4		
Maul	3	-	0/0	1	13/3	13/3
	4	-	(0.00)	1	(4.33)	(4.33)
	6	-		1		
Peripherally flaked cobble	0	-	0/0	4	4/5	4/5
	4	-	(0.00)	1	(0.80)	(0.80)
Blake	0	2	3/4	1	0/1	3/5
	1	1	(0.75)	-	(0.00)	(0.60)
	2	1		-		
Small linear flake	0	51	7/58	39	0.39	7/97
	1	7	(0.12)	-	(0.00)	(0.07)
Core	0	19	7/25	19	3/22	10/47
	1	5	(0.28)	3	(0.14)	(0.21)
	2	1		-		
Burin spall	1	2	2/2	-	0/0	2/2
			(1.00)		(0.00)	(1.00)
Resharpening flake	0	5	11/14	7	11/17	22/31
	1	8	(0.79)	9	(0.64)	(0.71)
	2	-		1		
	3	1		-		
Bifacially retouched object	0	24	59/53	13	45/42	104/95
	1	15	(1.11)	16	(1.07)	(1.09)
	2	7		11		
	3	3		1		
	4	-		1		
	5	3		-		
	6	1		-		
Unifacially retouched object	0	15	87/57	7	76/40	163/97
	1	17	(1.53)	10	(1.90)	(1.68)
	2	13		14		
	3	7		3		
	4	2		3		
	5	3		1		
	6	-		2		
Utilized only object	1	169	396/258	150	343/225	739/483
	2	60	(1.53)	49	(1.52)	(1.53)
	3	19		15		
	4	3		6		
	5	4		4		
	6	3		1		
Average ratio per component			636/510		604/462	1,240/972
			(1.25)		(1.31)	(1.28)

differences between components due to causes other than chance can be accepted only on the 50.0 to 75.0% level of confidence. Therefore, it is sugested that difference of use ratios between components for modified only objects are due to chance.

WEAR SPECIFIC ANALYSIS

Table 3-14 summarizes the kinds of wear, shapes of worn area, and edge angle groups for worn areas on formed objects. Percentage frequencies are given only for the total column because absolute numbers for components are small. Each object type is discussed below in order of representation on the table. It should be noted that if a bifacially retouched object has wear on only one face, the location will be expresssed as "unifacial edge". Conversely a unifacially retouched object may exhibit wear on both manufactured and unmanufactured sides. This will be expressed as "bifacial edge" wear. Wear listed as "edge only" is on the very edge of the object; it does not extend up either side. In the dimension "shape of worn area", areas listed as "abruptly convex" and "slightly convex" are lumped under "convex". The same is done for concave shapes. Areas of wear extending over a combination of convex, straight, and/or concave areas are called "irregular". Edge angles have been grouped into groups of 30 degrees each. This arbitrary division is meant to simplify the data; it does not result from discovery of natural groupings or modes in 5 degree edge angle measurements.

Projectile Points

Wear data for projectile points identified during functional analysis are presented in Table 3-14. For present purposes, the table lumps together the formal types "projectile point", "base", and "tip". This increases the number of wear areas to 58, a small number indeed for a site as large as 45-OK-258.

Kinds of wear on projectile points include smoothing, feathered chipping, hinged chipping, and combinations of these types of chipping with smoothing. **Smoothing** is defined as reduction that results in an area smooth to the touch and with no striations or gloss. Areas of smoothing are not confined to sides of points; they occur on tips as well as edges. Smoothing occurs on approximately 10% of the projectile point wear areas, both by itself and in combination with feathered and hinged chipping.

Both feathered and hinged chipping are noted. **Feathered chipping** is defined as flake scars that show detachment of whole flakes without breakage. **Hinged chipping** consists of flake scars with step or hinge fractures, indicating that the flake broke off the object. Feathered chipping occurs in just over 20% of the wear areas and hinged chipping is found on almost 70% of all projectile point wear areas.

Locations of wear include edge only, unifacial edges, bifacial edges, point only and point and two edges. Slightly over 72% of the wear areas are located on unifacial edges, almost 14% on bifacial edges, just over 5% on

Table 3-14. Summary of kind of wear, location of wear, and grouped edge angle for formed objects, 45-OK-258.

Formal Type and Wear Variables	Coyote Creek Component	Hudnut Component	Unassigned	Total	Column %
Projectile point					
Kind of Wear					
Smoothing	1	-	2	3	5.2
Feathered chipping	4	8	-	12	20.7
Feathered chipping/smoothing	1	-	-	1	1.7
Hinged chipping	18	20	2	40	69.0
Hinged chipping/smoothing	-	2	-	2	3.4
Location of Wear					
Edge only	1	-	2	3	5.2
Unifacial edge	19	21	2	42	72.4
Bifacial edge	4	4	-	8	13.8
Point only	-	2	-	2	3.4
Point and two edges	-	3	-	3	5.2
Grouped Edge Angle					
1-30 degrees	8	8	-	16	27.6
31-60 degrees	15	22	4	41	70.7
>60 degrees	1	-	-	1	1.7
Total	24	30	4	58	
Biface					
Kind of Wear					
Feathered chipping	9	-	-	9	12.5
Feathered chipping/smoothing	-	-	2	2	2.8
Hinged chipping	17	40	2	59	81.9
Hinged chipping/smoothing	1	-	1	2	2.8
Location of Wear					
Unifacial edge	19	27	1	47	65.3
Bifacial edge	7	12	3	22	30.6
Point only	1	-	-	1	1.4
Point and two edges	-	1	1	2	2.8
Grouped Edge Angle					
1-30 degrees	10	5	-	15	20.8
31-60 degrees	14	27	2	43	59.7
>60 degrees	3	7	2	12	16.7
Indeterminate	-	1	1	2	2.8
Total	27	40	5	72	
Burin					
Kind of Wear					
Feathered chipping	1	-	-	1	100.0
Hinged chipping	2	-	-	2	100.0
Location of Wear					
Unifacial edge	3	-	-	3	100.00
Grouped Edge Angle					
31-60 degrees	3	-	-	3	100.00
Total	3	-	-	3	
Chopper					
Kind of Wear					
Smoothing	2	3	2	7	15.2
Crushing/pecking	4	8	2	14	30.4
Feathered chipping	2	-	-	2	4.3
Hinged chipping	7	9	-	16	34.8
Hinged chipping/smoothing	-	2	-	2	4.3
Hinged chipping/crushing	2	3	-	5	10.9
Location of Wear					
Edge only	2	6	-	8	17.4
Unifacial edge	4	7	2	13	28.3
Bifacial edge	10	12	1	23	50.0
Terminal surface	1	-	1	2	4.3
Grouped Edge Angle					
31-60 degrees	3	4	-	7	15.2
>60 degrees	13	21	3	37	80.4
Surface	1	-	1	2	4.3
Total	17	25	4	46	

Table 3-14. Cont'd.

Formal Type and Wear Variables	Coyote Creek Component	Hudnut Component	Unassigned	Total	Column %
Drill					
Kind of Wear					
Feathered chipping	14	3	4	21	38.9
Feathered chipping/crushing	1	-	-	1	1.9
Hinged chipping	6	18	4	28	51.9
Hinged chipping/smoothing	1	2	-	3	5.6
Hinged chipping/crushing	-	-	1	1	1.9
Location of Wear					
Unifacial edge	8	13	3	24	44.4
Bifacial edge	3	-	2	5	9.3
Point and two edges	11	10	4	25	46.3
Grouped Edge Angle					
1-30 degrees	2	13	-	15	27.8
31-60 degrees	14	9	4	27	50.0
>60 degrees	5	-	3	8	14.8
Indeterminate	1	1	2	4	7.4
Total	22	23	9	54	
Graver					
Kind of Wear					
Feathered chipping	9	8	1	18	31.6
Hinged chipping	20	11	4	35	61.4
Hinged chipping/smoothing	1	2	1	4	7.0
Location of Wear					
Unifacial edge	17	11	2	30	52.6
Bifacial edge	-	1	-	1	1.8
Point only	-	1	-	1	1.8
Point and two edges	13	8	4	25	43.9
Grouped Edge Angle					
1-30 degrees	8	1	1	10	17.5
31-60 degrees	11	15	1	27	47.4
>60 degrees	4	1	3	8	14.0
Indeterminate	7	4	1	12	21.1
Total	30	21	6	57	
Pestle					
Kind of Wear					
Crushing/pecking	-	2	-	2	100.0
Location of Wear					
Terminal surface	-	2	-	2	100.0
Grouped Edge Angle					
Surface	-	2	-	2	100.0
Total	-	2	-	2	
Scraper					
Kind of Wear					
Feathered chipping	5	14	2	21	19.4
Feathered chipping/smoothing	1	2	1	4	3.7
Hinged chipping	15	58	5	78	72.2
Hinged chipping/smoothing	2	3	-	5	4.6
Location of Wear					
Unifacial edge	22	72	8	102	94.4
Bifacial edge	1	4	-	5	4.6
Point only	-	1	-	1	0.9
Grouped Edge Angle					
1-30 degrees	5	4	1	10	9.3
31-60 degrees	13	55	4	72	66.7
>60 degrees	5	18	3	26	24.1
Total	23	77	8	108	
Tabular knife					
Kind of Wear					
Smoothing	133	193	30	356	100.0
Location of Wear					
Edge only	132	193	30	355	99.7
Bifacial edge	1	-	-	1	0.3
Grouped Edge Angle					
1-30 degrees	28	47	10	85	23.9
31-60 degrees	89	136	18	243	68.3
>60 degrees	16	10	2	28	7.9
Total	133	193	30	356	

edges only and on points and two edges, and only 3% of the wear areas are situated on the point only. These relative frequencies suggest the wear was incurred when the points served some purpose other than projectiles.

Grouped edge angles of wear areas include all groups but surfaces. However, over 70% of wear occurs on areas with edge angles between 31 and 60 degrees. Over 27% of the wear occurs on areas with edge angles between 1-30 degrees, and less than 2% of the wear occurs on edge angles that are greater than 60 degrees.

A comparison between components indicates that the older Hudnut component exhibits a higher relative frequency of hinged chipping than the more recent Coyote Creek component, while smoothing is more prevalent in the Coyote Creek component. Location of wear on points, including points and edges, is restricted to the Hudnut component, and edge angles appear to be slightly steeper in the earlier Hudnut component. These chronological differences have to be viewed with caution, as the sample sizes are quite small.

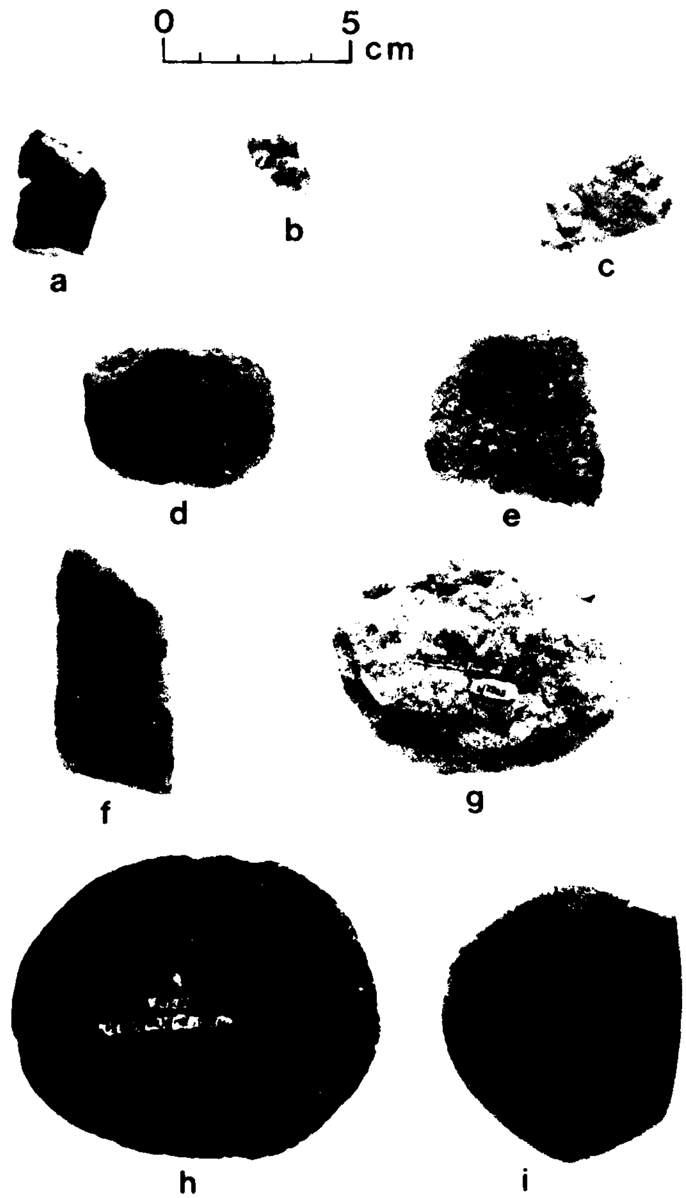
Bifaces

Bifaces show the same types of wear seen on projectile points except smoothing only (Table 3-14). Almost 85% of all areas exhibit hinged chipping, the remaining areas are feather chipped. Just over 5% of the wear areas exhibit smoothing in combination with the two types of chipping.

Locations of wear on bifaces include unifacial and bifacial edges, and a few examples of point only and points and two edges. Unifacial edge wear is present on almost two-thirds of the wear areas, while bifacial edge wear comprises slightly over 30% of the total. Just over 4% of all wear areas occur on points. The high frequency of unifacial wear is unexpected if the formal type "biface" is viewed as a cutting implement.

Grouped edge angles include all three groups and two examples of undetermined edge angles. Almost 60% fall in the 31-60 degree group. This frequency seems high, but many of the bifaces are quite crude, as seen in Plate 3-1. One-fifth of the edge angles fall into the 1-30 degree group, almost 17% fall into the greater than 60 degree group, and two edge angles could not be determined.

In comparing the two components, the table shows that only hinged chipping occurs in the Hudnut component, while feathered chipping, hinged chipping, and hinged chipping in combination with smoothing occur in the Kartar component. These differences are statistically significant at the 90% level of confidence, suggesting they probably are due to causes other than chance. Relative frequencies of various wear locations do not vary much between components. Edge angles are slightly steeper in the Hudnut component than in the more recent Coyote Creek component, but the difference are statistically significant.


0
5
cm
a
b
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i

KEY

Master Number:
Type:
Provenience:
Zone:
Material:

a. 1718
Core
0N41W/Fe107/205
5
Opal

b. 837
Core
7N44W/Fe300/130
3
Jasper

c. 271
Tabular knife
3N/34W/30
0
Coarse-grained quartzite

d. 974
Tabular knife
7N51W/Fe301/200
4
Coarse-grained quartzite

e. 1339
Tabular knife
2N49W/Fe19/190
4
Coarse-grained quartzite

f. 402
Tabular knife
13N64W/70
3
Coarse-grained quartzite

g. 2363
Tabular knife
2S29W/Fe12/65
2
Coarse-grained quartzite

h. 2173
Tabular knife
1S32W/Fe201/110
2
Basalt

i. 2027
Edge-ground cobble
2S35W/Fe501/170
5
Basalt

Plate 3-1. Examples of cores, tabular knives, and edge-ground cobbles, 45-OK-258.


a
b
c
d
e
f
g
h
i
j
k
l
m
n
o
p
q
r
s
t
0
5
cm

KEY: Master Number: / Type: / Provenience: / Zone: / Material:

	Master Number	Type	Provenience	Zone	Material
a.	1657	Scraper	0N45W/Fe302/100	5	Chalcedony
b.	1111	Scraper	3N47W/Fe301/165	4	Chalcedony
c.	1953	Scraper	3S39W/Fe501,500/220	5	Jasper
d.	1980	Scraper	1S35W/Fe33/175	5	Jasper
e.	1486	Scraper	5N47W/Fe301/180	4	Chalcedony
f.	935	Scraper	7N49W/Fe301/70	4	Chalcedony
g.	1504	Scraper	5N46W/Fe301/180	4	Jasper
h.	1470	Scraper	5N48W/Fe300,301/165	4	Jasper
i.	1239	Scraper	0N47W/Fe72/90	3	Jasper
j.	712	Scraper	9N51W/70	2	Jasper
k.	1050	Scraper	6N53W/Fe36/120	2	Chalcedony
l.	1097	Graver	3N48W/Fe301/160	4	Jasper
m.	1056	Graver	6N52W/Fe36/120	2	Chalcedony
n.	1740	Graver	0N40W/Fe500/170	4	Jasper
o.	1149	Graver	1N47W/Fe300/140	3	Petrified wood
p.	1805	Graver	1S39W/90	2	Chalcedony
q.	1132	Graver	1N48W/50	2	Chalcedony
r.	2449	Drill	4S26W/100	6	Jasper
s.	1249	Drill	1S47W/10	1	Chalcedony
t.	1055	Pipe	6N52W/Fe36/120	2	Steatite

Plate 3-2. Examples of scrapers, gravers, drills, and pipe, 45-OK-258.

Burins

As Table 3-14 shows, the three wear areas on burins, all from the Coyote Creek component, exhibit feathered chipping and hinged chipping on unifacial edges with edge angles that fall into the 31-60 degree group.

Choppers

Choppers are illustrated in Plate 3-1. Kinds of wear on choppers include smoothing, crushing and pecking, feathered chipping, and hinged chipping, alone or in combination with smoothing or crushing. Exactly one-half of all wear areas exhibit hinged chipping. Over 8% of these wear areas are smoothed, and almost 12% of them are crushed. Almost one-third of all wear areas are crushed and pecked, and less than one-sixth of all wear areas are smoothed. Less than 5% of all wear areas are feathered chipping. The **crushing/pecking** category is defined by the presence of at least three pits in close proximity on a surface; if this type of wear is identified on an edge, crushed crystals must be visible. High frequencies of crushing/pecking and hinged chipping are expected on choppers, but the relatively high frequency of smoothing indicates that choppers were utilized for other tasks in addition to chopping.

Wear occurs on edges only, unifacial and bifacial edges, and on terminal surfaces. One-half of the wear areas are located on bifacial edges, more than one-quarter of the wear occurs on unifacial edges, and less than one-fifth is found on edges only. The two instances of wear on a terminal surface comprise less than 5% of the wear areas. The locations of wear indicate that the implements probably were used for chopping and, in a quarter of the instances, for scraping also. Approximately 15% of the wear occurs on 31-60 degree edge angles, over four-fifths are on edge angles over 60 degrees, and slightly over 4% of the wear occurs on surfaces.

Differences between components of kinds of wear, location of wear, and grouped edge angles are too small to allow even nonstatistical inferences. From the data in Table 3-14, it is apparent that use of choppers did not change over time at 45-OK-258.

Drills

Examples of drills are illustrated in Plate 3-2. Kinds of wear on drills include feathered chipping, feathered chipping and crushing, hinged chipping, hinged chipping with smoothing and hinged chipping with crushing (Table 3-14). Over 60% of the wear areas exhibit hinged chipping, but only a few of these also show smoothing or crushing. The rest of the areas are feathered chipping, with one example of crushing.

The location of wear is restricted in 10% of all wear areas to bifacial edges. The remaining wear areas are almost equally divided between unifacial edges and points and two edges. One-half of the grouped edge angles fall into the 31-60 degree group. Just over one quarter of the angles are between 1 and

30 degrees. The remaining angles are either greater than 60 degrees or indeterminate.

Comparing components shows that hinged chipping is more prevalent in the earlier Hudnut component, while feathered chipping is more frequent in the Kartar component. A chi-square statistical analysis resulted in determining that the difference is due to causes other than chance at the 99.5% level of confidence. Differences in location of wear are minor, but grouped edge angles are steeper in the Kartar component. This difference is statistically significant at the 97.5% level of confidence, that is, differences in grouped edge angles of wear area are most likely due to causes other than chance.

Gravers

Gravers are illustrated in Plate 3-2. Wear areas on gravers are either feathered chipping or hinged chipping (Table 3-14). Only one wear area (7%) exhibits smoothing in conjunction with hinged chipping. A little less than one-third of all wear areas are feathered chipping, the remainder are hinged chipping.

Most of the wear is located on unifacial edges and points and two edges. Each of these two locations is represented by almost one half of the wear locations. One example each (2%) of bifacial edge wear and point only wear also occurs. Grouped edge angles fall into all three groups, and there are a number of indeterminate edge angles. Almost one half of the edge angles fall into the 31-60 degree group, and one fifth are in the indeterminate group. The remaining edge angles are divided almost equally between the 1-30 degree group and the over 60 degree group.

A comparison of components suggests that hinged chipping occurs in a slightly higher frequency in the Kartar component, but the difference is statistically insignificant. Locations of wear are very similar for both components, but edge angles are slightly steeper in the Hudnut component. This difference, based on a comparison of the numbers of angles in the 1-30 degree group with those in groups over 30 degrees, is significant at the 95% level of confidence. It is suggested that the differences in edge angles between components are most likely due to causes other than chance.

Pestles

Only two pestles, both from the Hudnut component, exhibited wear areas (Table 3-14). These wear areas are crushed and pecked, and they occur on terminal surfaces. Edge angles are not applicable.

Scrapers

Scrapers are illustrated in Plate 3-2. Wear areas on scrapers include four kinds of wear (Table 3-14). Almost three-quarters of all wear areas are hinged chipping, and almost one-fifth are feathered chipping. The remaining

wear areas combine either feathered chipping or hinged chipping with smoothing. Over 90% of the wear areas are located on unifacial edges. The remainder are located mostly on bifacial edges, but there is one example of wear located on a point only. Edge angles fall into all three groups, but the majority (two-thirds) are in the 31-60 degree group. Almost one-quarter of all edge angles fall into the greater than 60 degree group, and only about 10% are in the 1-30 degree group.

A comparison of wear area data between components shows very little difference in kind of wear and location of wear. However, the grouped edge angles in the Kartar component include a higher relative frequency in the 1-30 degree group than those in the Hudnut component. This difference is statistically significant on the 97.5% level of confidence, suggesting that angles of the Kartar component are most likely more shallow due to causes other than chance.

Tabular Knives

Tabular knives are illustrated in Plate 3-1. All of the 356 wear areas on tabular knives consists of smoothing, and all but one of the wear areas are on edges only. Grouped edge angles fall into all three groups, but over two-thirds are in the 31-60 degree group. An additional quarter of the angles are in the 1-30 degree group, while only a few angles are steeper than 60 degrees.

A comparison of wear data from tabular knives between components shows absolutely no differences, even in grouped edge angles. The data from 45-OK-258 show that manufacture and use of this type of implement did not change over 3,000 years.

Other Modified Objects

Kinds of wear, location of wear, and grouped edge angle for modified objects other than formed objects is presented in Table 3-15. Only hammerstones, bifacially retouched objects, unifacially retouched objects, and utilized only objects exhibited large numbers of wear areas. The following discussion is restricted to the most distinctive characteristics of each of these formal types.

Hammerstones exhibit mostly crushing and pecking wear on terminal surfaces. The very small number of exceptions are listed in the table. There is no discernible difference between components. Kinds of wear on bifacially retouched objects are restricted to feathered and hinged chipping located, in over 70% of the cases, on unifacial edges and, in almost 30% of the cases, on bifacial edges. Grouped edge angles fall into all three groups, but almost 60% are in the 31-60 degree group. The only difference between components occurs in the kinds of wear. Occurences of feathered chipping are higher in the more recent Hudnut component at the 90% level of confidence, indicating that the difference is probably due to causes other than chance.

Table 3-15. Summary of kind of wear, location of wear, and grouped edge angle for modified objects, 45-OK-258.

Formal Type and Wear Variables	Coyote Creek Component	Hudnut Component	Unassigned	Total
Anvil				
Kind of Wear				
Crushing/pecking	–	4	–	4
Location of Wear				
Surface	–	4	–	4
Grouped Edge Angle				
Surface	–	4	–	4
Total	–	4	–	4
Edge-gound cobble				
Kind of Wear				
Abrasion/grinding	–	3	–	3
Crushing/pecking	–	1	–	1
Hinged chipping/abrasion	–	2	–	2
Location of Wear				
Terminal surface	–	6	–	6
Grouped Edge Angle				
Surface	–	6	–	6
Total	–	6	–	6
Hammerstone				
Kind of Wear				
Crushing/pecking	58	84	5	147
Hinged chipping	1	–	–	1
Hinged chipping/crushing	1	–	–	1
Location of Wear				
Unifacial edge	1	–	–	1
Bifacial edge	4	–	–	4
Surface	4	3	1	8
Terminal surface	51	81	4	136
Grouped Edge Angle				
>60 degrees	5	–	–	5
Surface	55	84	5	144
Total	60	84	5	149
Hopper mortar base				
Kind of Wear				
Crushing/pecking	4	14	1	19
Polishing	–	1	–	1
Locaion of Wear				
Surface	4	15	1	20
Grouped Edge Angle				
Surface	4	15	1	20
Total	4	15	1	20
Maul				
Kind of Wear				
Crushing/pecking	–	11	–	11
Hinged chipping/crushing	–	2	–	2
Location of Wear				
Unifacial edge	–	1	–	1
Point and two edges	–	1	–	1
Surface	–	4	–	4
Terminal surface	–	7	–	7
Grouped Edge Angle				
>60 degrees	–	1	–	1
Surface	–	11	–	11
Indeterminate	–	1	–	1
Total	–	13	–	13

Table 3-15. Cont'd.

Formal Type and Wear Variables	Coyote Creek Component	Hudnut Component	Unassigned	Total
Peripherally flaked cobble				
Kind of Wear				
Hinged chipping	–	4	–	4
Location of Wear				
Bifacial edge	–	4	–	4
Grouped Edge Angle				
>60 degrees	–	4	–	4
Total	–	4	–	4
Burin spall				
Kind of Wear				
Hinged chipping	2	–	–	2
Location of Wear				
Bifacial edge	1	–	–	1
Point only	1	–	–	1
Grouped Edge Angle				
1-30 degrees	2	–	–	2
Total	2	–	–	2
Linear flake				
Kind of Wear				
Feathered chipping	7	–	–	7
Location of Wear				
Unifacial edge	7	–	–	7
Grouped Edge Angle				
1-30 degrees	6	–	–	6
31-60 degrees	1	–	–	1
Total	7	–	–	7
Core				
Kind of Wear				
Feathered chipping	5	1	5	11
Hinged chipping	2	2	2	6
Locaion of Wear				
Unifacial edge	4	2	4	10
Bifacial edge	3	1	3	7
Grouped Edge Angle				
1-30 degrees	–	1	1	2
31-60 degrees	4	1	5	10
>60 degrees	3	1	1	5
Total	7	3	7	17
Bifacially retouched flake				
Kind of Wear				
Feathered chipping	25	11	–	36
Hinged chipping	34	34	5	73
Location of Wear				
Edge only	–	1	–	1
Unifacial edge	40	33	4	77
Bifacial edge	19	11	1	31
Grouped Edge Angle				
1-30 degrees	18	16	–	34
31-60 degrees	33	28	3	64
>60 degrees	8	1	2	11
Total	59	45	5	109
Resharpening flake				
Kind of Wear				
Feathered chipping	5	2	2	9
Hinged chipping	5	9	1	15
Hinged chipping/smoothing	1	–	–	1

Table 3-15. Cont'd.

Formal Type and Wear Variables	Coyote Creek Component	Hudnut Component	Unassigned	Total
Resharpening flake (contined)				
Location of Wear				
Unifacial edge	4	10	2	16
Bifacial edge	7	1	1	9
Grouped Edge Angle				
1-30 degrees	6	5	1	12
31-60 degrees	5	6	2	13
Total	11	11	3	25
Unifacially retouched flake				
Kind of Wear				
Smoothing	-	2	-	2
Feathered chipping	36	34	1	71
Hinged chipping	50	40	2	92
Hinged chipping/smoothing	1	-	1	2
Locaton of Wear				
Edge only	-	2	-	2
Unifacial edge	80	64	3	147
Bifacial edge	6	9	1	16
Point and unifacial edge	1	-	-	1
Point and two edges	-	1	-	1
Grouped Edge Angle				
1-30 degrees	40	22	1	63
31-60 degrees	39	47	2	88
>60 degrees	8	7	1	16
Total	87	76	4	167
Utilized only flake				
Kind of Wear				
Smoothing	2	-	-	2
Feathered chipping	264	237	62	563
Feathered chipping/smoothing	3	1	-	4
Hinged chipping	125	105	30	260
Hinged chipping/smoothing	2	-	-	2
Location of Wear				
Edge only	3	1	-	4
Unifacial edge	316	292	87	695
Bifacial edge	70	45	5	120
Point only	2	4	-	6
Point and unifacial edge	1	-	-	1
Point and bifacial edge	1	-	-	1
Point and two edges	3	1	-	4
Grouped Edge Angle				
1-30 degrees	231	179	68	478
31-60 degrees	130	126	22	278
>60 degrees	35	38	2	75
Total	396	343	92	831
Indeterminate				
Kind of Wear				
Crushing/pecking	-	2	-	2
Hinged chipping	-	1	-	2
Location of Wear				
Point and two edges	-	1	-	1
Surface	-	1	-	1
Terminal surface	-	1	-	1
Grouped Edge Angle				
>60 degrees	-	1	-	1
Surface	-	2	-	2
Total	-	3	-	3

Most of the kinds of wear on unifacially retouched objects are either feathered or hinged chipping, with hinged chipping occurring slightly more often. However, smoothing and smoothing in conjunction with hinged chipping also occurs in less than 2% of the cases. Most of the wear (almost 90%) is located on unifacial edges. Over one half of all angles fall into the 31-60 degree group, and over one third are in the over 60 degree group. Differences between components are minor in kinds and location of wear, but edge angles in the earlier Hudnut component are significantly steeper than those in the Kartar component at the 95% level of confidence.

Wear areas on utilized only objects are mostly feathered chipping (almost 70%) and hinge chipping (just over 30%). Other kinds of wear occur in very minor frequencies. Wear is located mostly on unifacial edges (84%) and, in much smaller numbers, on bifacial edges (14%). Very infrequent occurences of wear locations on edges only, point, unifacial and bifacial points, and point and two edges are also noted. Grouped edge angles fall mostly into the 1-30 degree group (over one half) and the 31-60 degree group (over one third). Small numbers of angles also occur in the over 60 degree group.

Differences between cmponents are minor for kinds of wear locations of wear, and grouped edge angles. Apparently, waste flakes and other unmodified objects were used indiscriminately and in larger numbers during the site's occupation.

SUMMARY

In summarizing the object specific and wear specific analyses, we propose to look at the data from a slightly different view point than that presented in the above discussion. Table 3-16 presents the frequencies of formal types with wear areas per component and for both components. Objects from excavated unit levels not assigned to one of the components have been deleted, as have the formal types beads, pipes, amorphously flaked objects, and indeterminate objects.

The formal objects shown in Table 3-16 fall readily into three groups of use frequencies. Object types that show usage frequencies of 90 to 100% include anvils, burins, burin spalls, drills, gravers, hammerstones, pestles, scrapers, tabular knives, and utilized only objects. Object types with usage frequencies of 60 to 85% include bifacially retouched objects, choppers, hopper-mortar bases, mauls, resharpening flakes, and unifacially retouched objects. Object types with a usage frequency of less than 40% include bifaces, blades, cores, edge-ground cobbles, linear flakes, peripherally flaked cobbles, and projectile points.

Inclusion of object types in the three usage frequency groups depends in part on definition of the object types, and in part on intended function. Hammerstones and utilized only objects always show a 100% use frequency because they are identified on the basis of wear areas. Cores and bifacially and unifacially modified objects (mostly flakes), on the other hand, are

Table 3-16. Frequencies of objects with wear areas by formal type per component, 45-OK-258.

Formal Type	Coyote Creek Component			Hudnut Component			Total		
	Objects N	Worn Objects N	% Worn of Object Type	Objects N	Worn Objects N	% Worn of Object Type	Objects N	Worn Objects N	% Worn of Object Type
Projectile point	155	19	12	134	22	16	289	41	14
Biface	74	17	23	60	10	17	134	27	20
Burin	3	3	100	-	-	-	3	3	100
Chopper	13	9	69	18	11	61	31	20	65
Graver	13	13	100	9	9	100	22	22	100
Drill	12	11	92	10	10	100	22	21	95
Pestle	-	-	-	1	1	100	1	1	100
Scraper	9	9	100	26	25	96	35	34	97
Tabular knife	95	91	96	134	124	93	229	215	94
Anvil	-	-	-	1	1	100	1	1	100
Edge-ground cobble	1	-	-	2	1	50	3	1	33
Hammerstone	33	33	100	52	52	100	85	85	100
Hopper-mortar base	5	4	80	13	11	85	18	15	83
Maul	-	-	-	3	2	68	3	2	68
Peripherally flaked cobble	-	-	-	5	1	20	5	1	20
Blade	4	2	50	1	-	-	5	2	40
Linear flake	58	7	12	39	-	-	97	7	7
Core	25	6	24	22	3	14	47	9	19
Burin spall	2	2	100	-	-	-	2	2	100
Resharpening flake	14	9	64	17	10	59	31	19	61
Bifacially retouched object	53	29	54	42	29	69	95	58	61
Unifacially retouched object	57	42	74	40	33	83	97	75	77
Utilized only object	258	258	100	225	225	100	483	483	100

byproducts of artifact manufacture, and thus are probably used by chance because they were readily available when a task had to be performed.

We assume that all formed objects were made for a limited range of tasks, and that the usage of these formal types reflects the immediacy of the tasks. All formal types in the most frequently used group, including burins, drills, pestles, scrapers, and tabular knives, were most likely made to be used for tasks at the site. Formal types in the least frequently used group, including bifaces, projectile points, blades, and small linear flakes, were possibly manufactured at the site to be used elsewhere. Choppers, mauls, and hopper-martar bases could have been made at the site and used there and at other locations. However, if any of these artifacts were used primarily to work very soft materials, such as boneless meat, usage would not necessarily be detected by our analysis. This could be the case with the blades and small linear flakes and, at least in part, also with the bifaces.

Disregarding formed objects that may have been used primarily for working very soft materials, byproducts of lithic reduction, object types defined on the basis of wear areas, and object types including fewer than ten objects, we make the following suggestion. Drills, gravers, scrapers, and tabular knives were manufactured to be used at the site. Projectile points and, perhaps, bifaces were made at the site to be used mostly elsewhere, and choppers and hopper-mortar bases were used both on the site and in other places. Off-site use may have occurred in areas near the site or far away. The usage pattern indicates that all activities were carried out to varying degrees at the site, but the hunting tool kit (projectile points and bifaces) was used least and the plant collecting and processing tool kit (hopper-mortar bases and choppers) was used more frequently off the site than the maintenance tool kit (drills, gravers, scrapers, and tabular knives). This does not reflect the quantity of activity carried out away from the site, but it may refleect distances tool kits are transported. It is, obviously, easier to carry projectile points and bifaces than hopper-mortar bases and choppers. Therefore, a proportionally larger number of hunting implements were manufactured at the site for use for off-site activities, and fewer plant collecting implements for off-site use were manufactured at the site.

Two different kinds of inferences can be drawn from the wear specific analysis. First, the kinds of wear identified on wear areas allows inferences about the kinds of materials on which the tools were used. Secondly, the location of wear and the grouped edge angles suggest inferences about the motion involved.

Using implements on materials of varying hardness results in different kinds of wear. If an implement is used on hard materials, either crushing/pecking or detachment or hinged chips will result, depending on the applied force and the direction of this force. Implements used on objects made of somewhat softer materials will exhibit feathered chipping or abrasion/grinding. If implements are used on soft materials, smoothing or polishing will result. However, if implements are used on soft materials with

little force, or if they are used on very soft materials, no visible wear may result.

Table 3-17 summarizes kinds of wear identified on implements from 45-OK-258. The formal types are ordered by the relative frequencies of crushing/pecking, hinged chipping, and feathered chipping. Tabular knives, which exhibit smoothing only, are placed beneath choppers because choppers show the second highest frequencies of usage on hard materials and increasing usage on soft materials. Percentage frequencies were grouped because when two kinds of wear occurred on the same wear area, such as feathered chipping and smoothing, the percentage was added to both kinds of wear.

All implements with a majority of crushing/pecking wear were probably used for pounding, either directly or indirectly on other lithic objects. It is assumed that pestles and hopper-mortar bases were used to process softer plants, but use of pestles on the bases, even with the intervening plant material, still resulted in crushing/pecking. Incidently, the wear area on one hopper-mortar base consists of polishing, indicating that this implement is probably a milling stone rather than a hopper-mortar base. Tabular knives and, to a lesser extent, choppers were probably used on a soft but tough material, such as hides. The next group of implements, from burin spalls to unifacially retouched objects, were used on hard materials, such as other lithics and bone, to materials of intermediate hardness, such as wood, and on soft materials, such as hides. Cores and utilized only objects were probably used on materials of medium hardness and soft materials, while small linear flakes were used on soft materials only.

In order to investigate the interrelationship of implements that exhibit hinged chipping, feathered chipping, and smoothing, the basic percentage frequencies of these kinds of wear were plotted on a triangular coordinate graph for formal types with ten or more wear areas. Only primary kinds of wear were included. For example, for kinds of wear consisting of both chipping and smoothing, only the chipping is plotted. The results (Figure 3-1) show an almost linear relationship between all implements except tabular knives. Distances between plots probably show use relationship between formal types. The figure indicates that projectile points and scrapers are used on materials of similar hardness. Bifaces apparently were used on harder material, while cores and drills were utilized to work softer materials. Bifacially and unifacially retouched objects were plotted by component because previously disussed chi-square test determined that differences between components are significant. The figure shows that bifacially retouched objects were used on softer materials in the later Hudnut component than in the earlier Coyote Creek component, while the reverse is indicated for unifacially retouched objects. Tabular knives apparently were used for the most **unusual** materials, causing smoothing exclusively.

A summary of wear location, presented in Table 3-18, indicates kinds of use. It is assumed that unifacial wear indicates scraping while bifacial wear indicates use for cutting. Wear on surfaces shows use for either pounding or

Table 3-17. Summary of kinds of wear, 45-OK-258.

Formal Type	Number of Wear Areas	Percent Crushing/packing				Percent Hinged Chipping				Percent Feathered Chipping				Percent Abrasion/ grinding	Percent Smoothing				Percent Polishing
		>50	21-50	10-20	<10	>50	21-50	10-20	<10	>50	21-50	10-20	<50	>50	>50	21-50	10-20	<10	<10
Anvil	4	x																	
Peripherally flaked cobble	4	x																	
Pestle	2	x																	
Hopper mortar base	20	x																	x
Hammerstone	149	x							x										
Maul	13	x						x											
Chopper	48		x				x						x				x		
Tabular knife	358														x				
Edge-ground cobble	6			x										x					
Burin spall	2					x													
Biface	72					x						x						x	
Scraper	108					x					x							x	
Burin	3					x					x								
Bifacially retouched flake	109					x					x								
Drill	54			x		x					x							x	
Graver	57					x					x							x	
Projectile point	58					x					x						x		
Resharpening flake	25					x					x							x	
Unifacially retouched object	187					x					x							x	
Core	17						x			x									
Utilized only flake	831						x			x									
Linear flake	7									x									

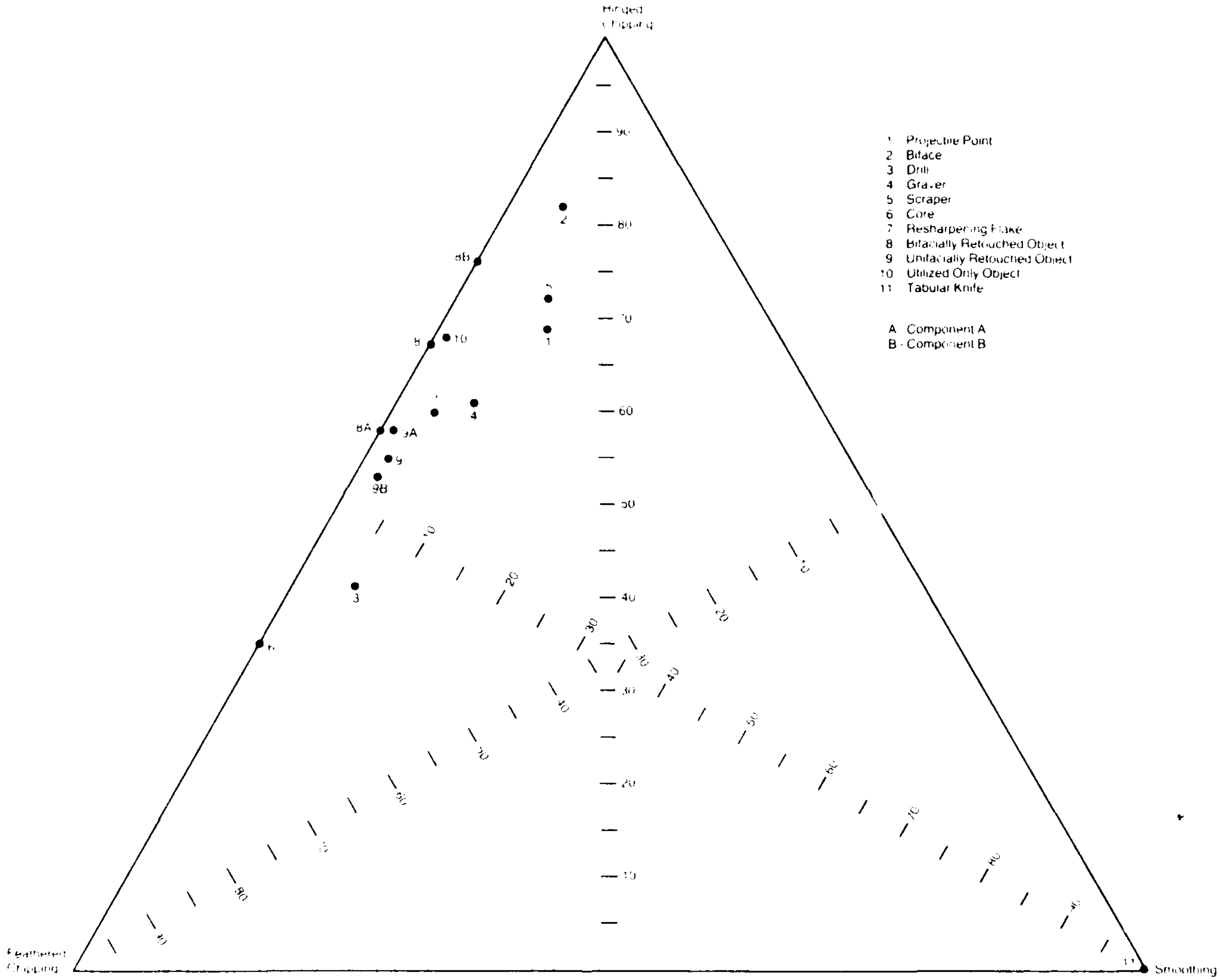

Figure 3-1. Relative proportions of chipping and smoothing wear on formal types, 45-OK-258.

Table 3-18. Summary of location of wear, 45-OK-258.

Formal Type	Number of Wear Areas	Surface and Terminal Surface (%)	Point and Point and Edge(s) (%)	Bifacial Edge (%)	Unifacial Edge (%)	Edge Only (%)
Anvil	4	100	-	-	-	-
Edge-ground cobble	6	100	-	-	-	-
Hopper mortar base	20	100	-	-	-	-
Pestle	2	100	-	-	-	-
Hammerstone	149	97	-	3	1	-
Maul	13	86	8	-	8	-
Chopper	46	4	-	50	28	17
Tabular knife	356	-	-	-	-	100
Peripherally flaked cobble	4	-	-	100	-	-
Burin spall	2	-	50	50	-	-
Drill	54	-	46	9	44	-
Graver	57	-	46	2	53	-
Biface	72	-	3	31	65	-
Resharpening flake	25	-	-	36	64	-
Core	17	-	-	41	69	-
Bifacially retouched object	109	-	-	28	71	1
Projectile point	58	-	9	14	72	5
Utilized only object	831	-	1	14	84	1
Unifacially retouched object	167	-	1	10	88	1
Scraper	108	-	1	5	94	-
Burin	3	-	-	-	100	-
Linear flake	7	-	-	-	100	-

grinding purposes, depending on the kinds of wear identified on the wear areas. Actual percentage frequencies are shown in the tables.

Crushing/pecking wear areas located on the surfaces suggest that anvils, hopper-mortar bases, pestles, hammer stones and mauls were used for pounding. Edge-ground cobles have abrasive grinding with some crushing/pecking wear areas located on surfaces, indicating they were used primarily for grinding and secondarily for pounding. All of the wear on peripherally flaked cobbles is located on bifacial edges. Since this wear consists of crushing and pecking only, we suggest that these are pounding implements that were used differently than other pounding implements.

Formal type implements with approximately half of the wear located on points and points and edges include burin spalls, drills and gravers. The twisting action ascribed to drills also resulted in unifacial edge wear, as did the scoring action of gravers. Burin spalls, on the other hand, were used in a manner to cause bifacial wear. This contrasts sharply with the wear locations on burins, which are restricted to unifacial edges. We suggest that burin spalls were used for cutting rather than scoring, but cutting of a hard material, such as bone, as indicated by the exclusive hinged chipping wear.

Tabular knives, exhibiting wear on edges only in conjunction with smoothing only, are the most specialized tools because they apparently served only one function and were used on only one kind of material. We suggest that these implements were used to make animal skin pliable. Some wear location and kinds of wear on choppers suggest that these implements were used, in part, for the same purpose.

Wear areas of the remaining formal type implements are located mainly on unifacial and/or bifacial edges. Choppers include bifacial and unifacial edge wear as well as edge only wear, discussed above. Kinds of wear for choppers are equally diverse, and it is suggested that these are generalized implements used for a variety of tasks.

All remaining formal type implements were apparently used for both scraping and cutting except for small linear flakes. Cores, resharpening flakes, bifaces and, to a lesser extent, bifacially retouched objects were used for cutting more frequently than projectile points, utilized only objects, unifacially retouched objects, and scrapers. All of these formal types apparently were used extensively for a scraping-like action on materials with similar degrees of hardness. Only small linear flakes were apparently used exclusively for a scraping-like action on a soft material. Perhaps small linear flakes were used to cut meat into bite-sized portions by holding it with the front teeth and using the implements in a unidirectional motion. This use left few traces, as indicated by the very low frequency of wear areas on these implements.

The interrelationships of wear locations including unifacial edge, bifacial edge, and point (with or without edges) are shown in Figure 3-2. Edge only and surface percentage frequencies are deleted because the graph can only include three characteristics, and only formal types with more than 15 wear areas are included. The formal types fall into three groups. Projectile

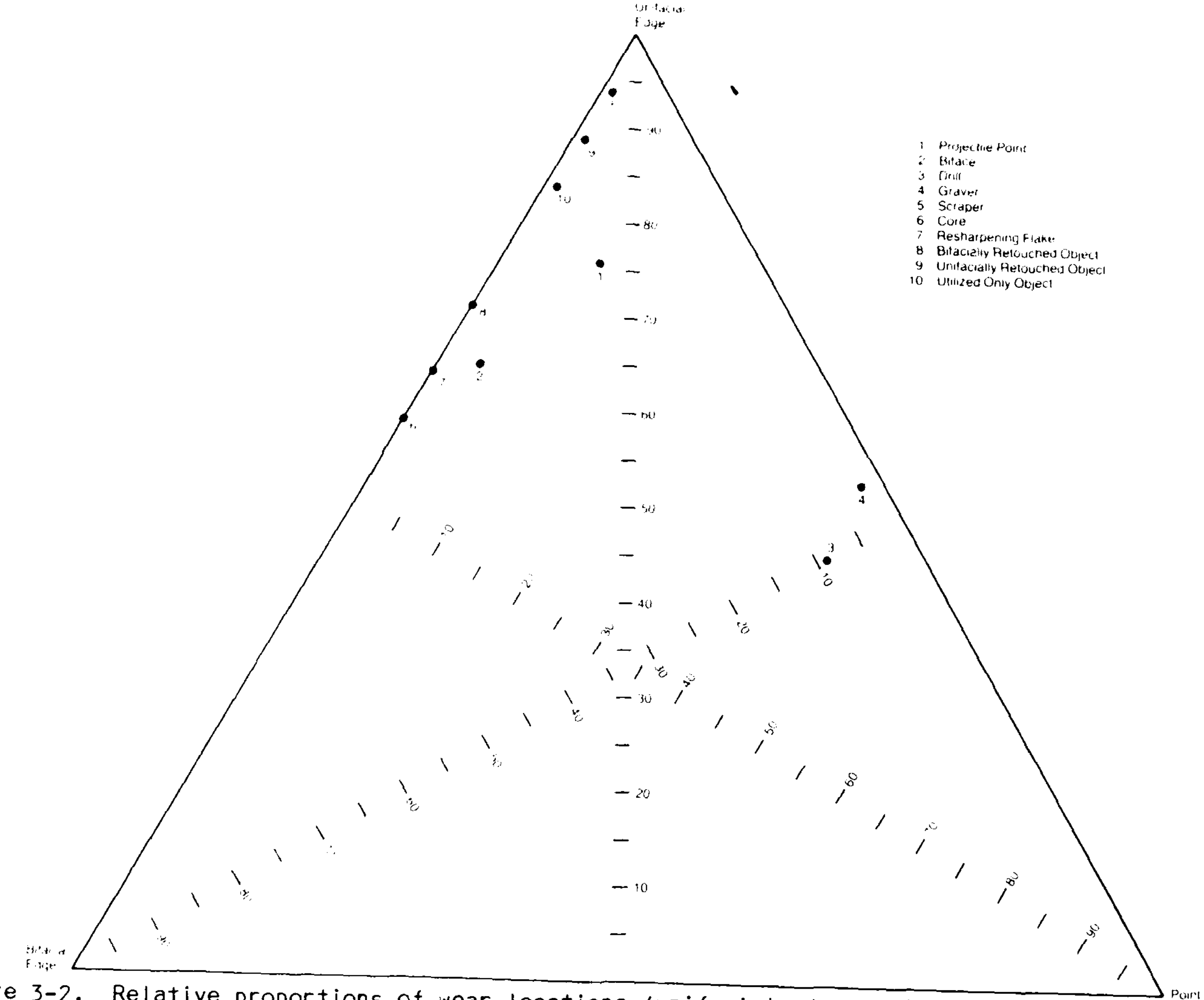

Figure 3-2. Relative proportions of wear locations (unifacial edge, bifacial edge, and point only) by formal type, 45-OK-258.

points, scrapers, unifacially retouched objects, and utilized only objects cluster toward the unifacial edge point. Bifaces, cores, resharpening flakes, and bifacially retouched objects tend to include more bifacial edge wear. Drills and gravers form a well defined cluster distinguished by abundant wear on points.

In summary, a comparison of Figures 3-1 and 3-2 shows that use of the following formal type implements is closely related: projectile points and scrapers, unifacially retouched objects and utilized only objects, resharpening flakes and bifacially retouched objects, and drills and gravers. Bifaces and cores appear to resemble resharpening flakes and bifacially retouched objects more than they do other implements or each other. The relationships indicate similar actions applied to materials of similar consistencies. The integration of projectile points with other implements, as based on our anlyses of wear areas, is noteworthy, but of limited importance because of the very low frequency of wear areas on projectile points. The analyses suggest that projectile points are used infrequently at the site, and that their use is similar to that of scrapers.

STYLISTIC ANALYSIS

Stylistic analyses were carried out for projectile points, cobble tools, and bone implements found at 45-OK-258. Only the projectile point stylistic analysis is discussed in detail; results of the others are presented without elaboration.

PROJECTILE POINTS

Two separate but conceptually related analyses are used to classify projectile points. A **morphological classification** is used to define descriptive types that do not directly correspond to recognized historical types. This procedure acts as an independent check on the temporal distribution of projectile point forms in the Rufus Woods project area and measures the distribution of formal attributes as well as point styles. An **historical classification** correlates these projectile points with recognized types with discrete temporal distributions. A multivariate statistical program that compares line and angle measurements taken along the outlines of the points is used to classify the specimens. Together, these analyses allow us to (1) assess formal and temporal variation in our collection without first imposing prior typological constructs, (2) correlate specimens recovered from our study area with those found elsewhere on the Columbia Plateau in a consistent, verifiable manner, (3) develop a typology that incorporates both qualitative and quantitative scales of measurement, and (4) examine the temporal significance of specific formal attributes as well as aggregates viewed as ideal types. For a complete description of the historical analysis see Lohse (1985).

AD-A166 801 ARCHAEOLOGICAL INVESTIGATIONS AT SITE 45-OK-258 CHIEF JOSEPH DAM PROJECT WASHINGTON(U) WASHINGTON UNIV SEATTLE OFFICE OF PUBLIC ARCHAEOLOGY 2/3

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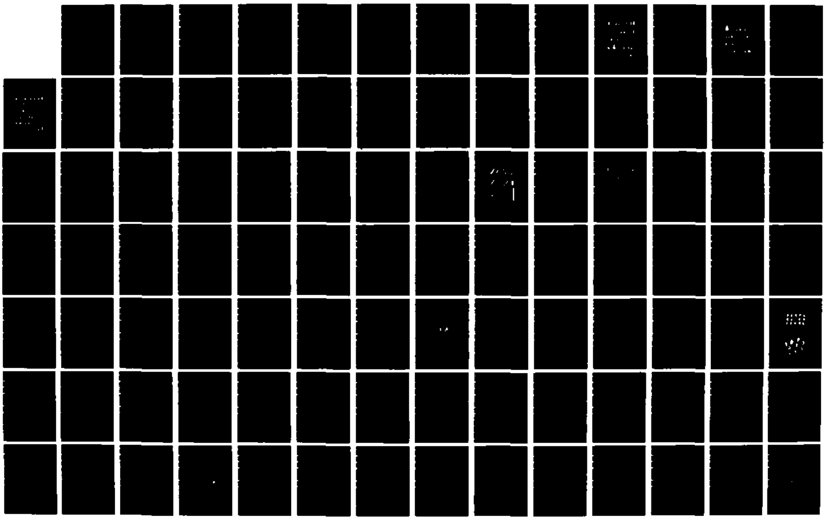
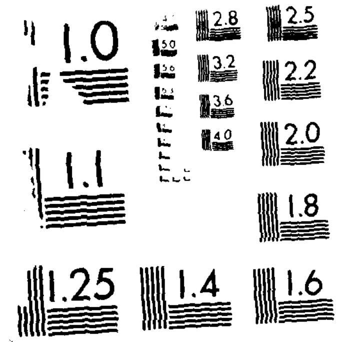




MICROCOPY RESOLUTION TEST CHART

Eleven classificatory dimensions were defined for morphological classification: BLADE/STEM JUNCTURE, OUTLINE, STEM EDGE ORIENTATION, SIZE, BASAL EDGE SHAPE, BLADE EDGE SHAPE, CROSS SECTION, SERRATION, EDGE GRINDING, BASAL EDGE THINNING, and FLAKE SCAR PATTERN. Of these, the first four (D1–D4) define 18 morphological types. The other seven describe these types more fully and permit the identification of variants within the types. Table 3-19 outlines these dimensions and associated attributes.

By defining the margins of projectile points, we are able to place them within one of the 18 morphological types. This is done by drawing straight lines from nodes where the outline of the specimen changes direction. Figure 3-3 illustrates the technique and Figure 3-4 lists the 18 morphological types with descriptions, classification codes, and line definitions.

We have defined historical types on the basis of line and angle measurements in order to have a consistent classification method which utilizes published illustrations of projectile points. Other measurements, such as weight and thickness, were taken on projectile points in our collection, but problems of cost and efficiency precluded handling of specimens from other study areas. These measurements can be included in analysis of our points and, hence, for the definition of types and type variants that will correlate with acknowledged types, but they are not part of the initial typological exercise. Justification for this decision is found in prior research emphasizing the outline of projectile points as the basis of classification (Benfer 1967; Ahler 1970; Gunn and Prewett 1975; Holmer 1978).

Our desire for a statistically derived classification prompted selection of a multivariate statistical method termed discriminant analysis (Nie et al. 1975). In this analysis, individual specimens are sorted into selected groups on the basis of mathematical equations derived from analysis of cases with known memberships. First, we assembled representative specimens for each acknowledged historical type, and tested group autonomy through analysis of specified discriminating variables. Then, we used derived equations called discriminant functions to assign specimens in our collection to the statistically defined projectile point types. All cases are given a probability of group membership, calculated as the distance a given case score is away from a group score. Discriminating variables--those providing the most separation between groups--are ranked and serve as type definitions. The outcome is a statistically defensible projectile point typology based on traditional, intuitively derived classifications. The resulting classification is consistent, and produces mathematically defined ranges of variability. It enables the researcher to quickly categorize a large collection. It also offers a sound, rational basis for definition of new types as well as an explicit definition of accepted types. We can thereby correlate the Rufus Woods Lake projectile point sequence with other chronologies in both a quantitative and qualitative manner. For a detailed discussion of procedures and assumptions involved in discriminant analysis see Johnson (1978) and Klecka (1980).

We assembled a type collection for the Columbia Plateau of over 1200 projectile points that constituted originally defined type examples, labelled

Table 3-19. Dimensions of morphological projectile point classification.

DIMENSION I: BLADE-STEM JUNCTURE

N. Not separate
1. Side-notched
2. Shouldered
3. Squared
4. Barbed
9. Indeterminate

DIMENSION II: OUTLINE

N. Not applicable
1. Triangular
2. Lanceolate
9. Indeterminate

DIMENSION III: STEM EDGE ORIENTATION

N. Not applicable
1. Straight
2. Contracting
3. Expanding
9. Indeterminate

DIMENSION IV: SIZE

N. Not applicable
1. Large
2. Small

DIMENSION V: BASAL EDGE SHAPE

N. Not applicable
1. Straight
2. Convex
3. Concave
4. Point
5. 1 or 2 and notched
9. Indeterminate

DIMENSION VI: BLADE EDGE SHAPE

N. Not applicable
1. Straight
2. Excurvate
3. Incurvate
4. Reworked
9. Indeterminate

DIMENSION VII: CROSS SECTION

N. Not applicable
1. Planoconvex
2. Biconvex
3. Diamond
4. Trapezoidal
9. Indeterminate

DIMENSION VIII: SERRATION

N. Not applicable
1. Not serrated
2. Serrated
9. Indeterminate

DIMENSION IX: EDGE GRINDING

N. Not applicable
1. Not ground
2. Blade edge
3. Stem edge
9. Indeterminate

DIMENSION X: BASAL EDGE THINNING

N. Not applicable
1. Not thinned
2. Short flake scars
3. Long flake scars
9. Indeterminate

DIMENSION XI: FLAKE SCAR PATTERN

N. Not applicable
1. Variable
2. Uniform
3. Mixed
4. Collateral
5. Transverse
6. Other
9. Indeterminate

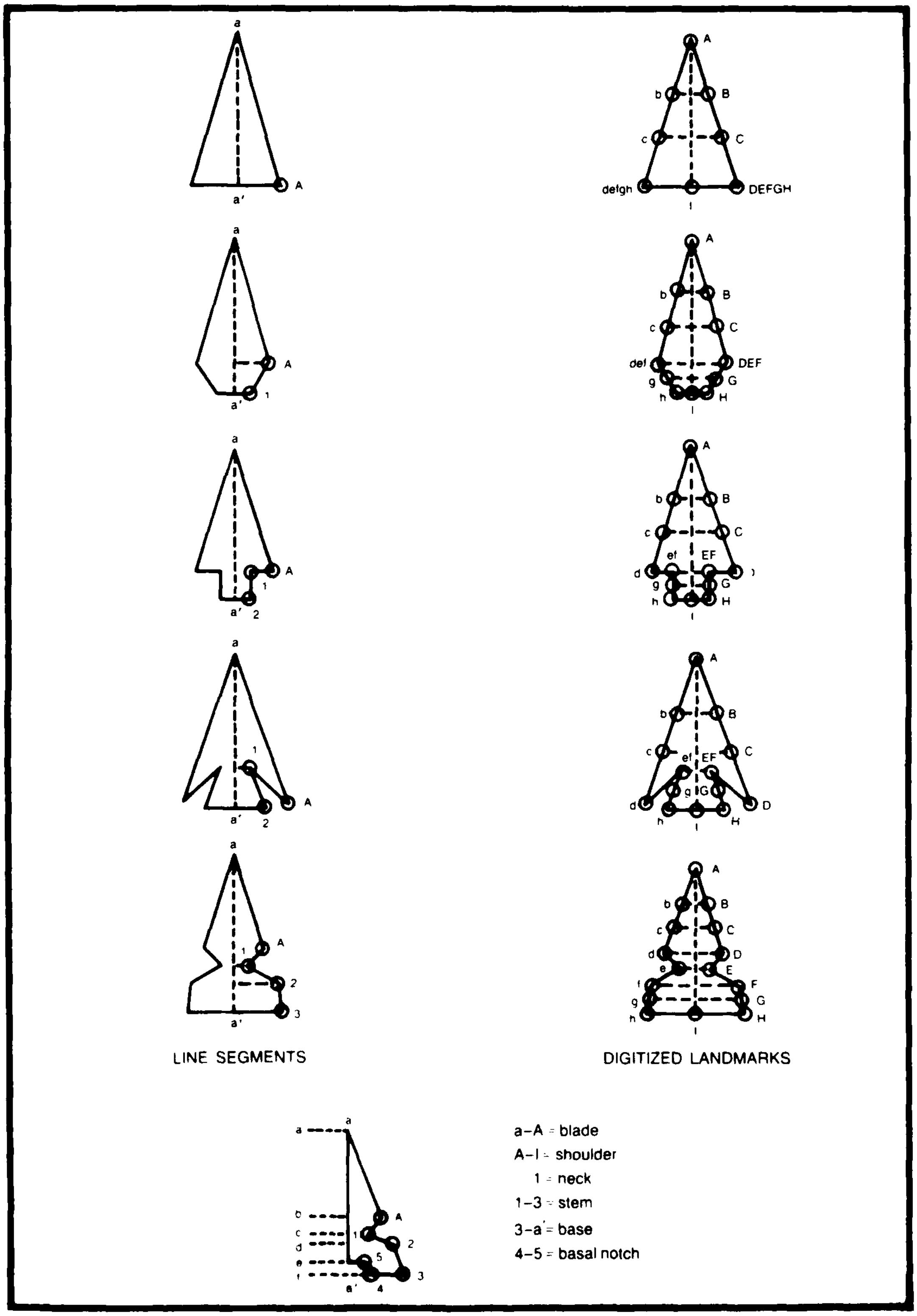


Figure 3-3. Definition of projectile point outline.

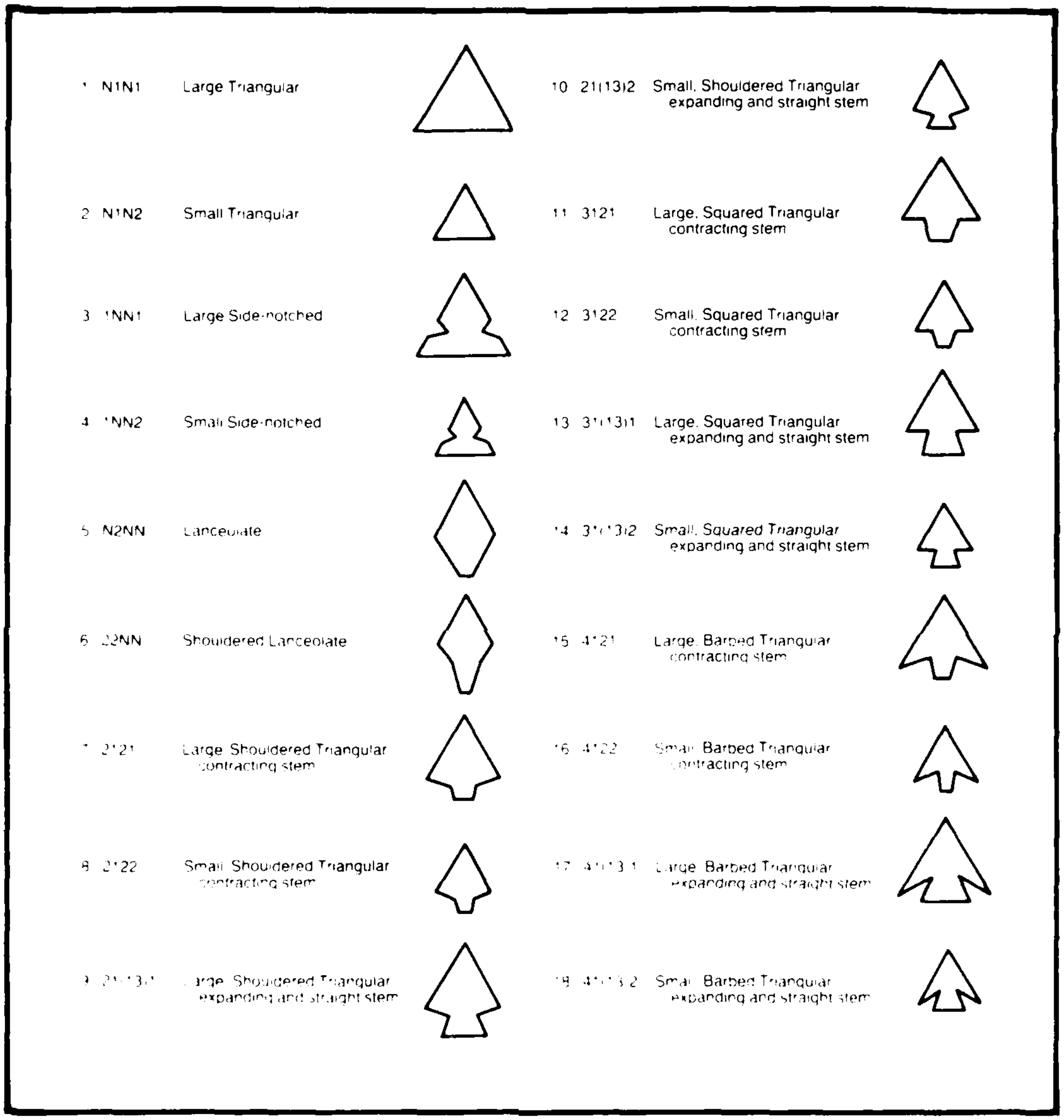


Figure 3-4. Morphological projectile point types.

specimens of recognized types, or type variants that were reasonably well dated. By critically reviewing the archaeological literature, we identified 23 historical types that we arranged in six formal type series (Figure 3-5). We consistently applied distinctions based on the original type definitions, modified, where appropriate, by subsequent research. We routinely defined type variants, usually suggested by prior researchers, which segregate specimens according to diagnostic patterns in morphology. Historical types identified here represent a synthesis of projectile point types and cultural econstructions postulated by researchers in different areas of the Columbia Plateau, and were not taken from any single typology or chronological sequence (e.g., Butler 1961, 1962; Nelson 1969; Leonhardy and Rice 1970). Names are usually those applied by the first researcher to define a specific type. We developed variant labels by using the accepted type name followed by a letter denoting diagnostic variation. For a complete discussion of procedures, see Lohse (1985).

The complete classification of projectile points from 45-OK-258 is pesented in Appendix B, Table B-1. A total of 165 projectile points are classified, including those labeled as projectile points and many specimens designated "bases" in the lithic analysis tables. Points fall into 17 morphological types and 14 historical types. The two classifications do not completely coincide. The relationship between morphological and historical types is shown in Table 3-20. Projectile points are illustrated in Plates 3-3 through 3-5 and the digitized outlines are shown in Appendix B, Figure B-1.

The relationship between morphological and historical types is not a direct one, as an inspection of Table 3-20 shows. For example, only three of the historical types comprised of more than one projectile point are made up of only one morphological type (Type 21, Cascade A; Type 42, Plateau Side-notched; and Type 62, Quilomene Bar Corner-notched). On the other end of the scale, Type 51 (Rabbit Island A) includes ten morphological types.

Morphological Projectile Point Types

Table 3-21 presents the morphological projectile point types by zone and component. All but one of the 18 defined morphological types are represented at 45-OK-258, but only Types 4, 7, 8, 11, 12, 13, 14, and 18 include more than ten examples each. Classifiable projectile points are found in all zones at 45-OK-258, but only Zones 2 (Coyote Creek component) and Zones 3 and 4 (Hudnut component) yielded over 25 specimens. Due to the low absolute number of projectile points in Zones 1, 5, and 6, and the disturbed nature of the site matrix through bioturbation and prehistoric cultural activity, comparisons are made between components rather than among zones.

Only Type 7 (large, shouldered triangular, contracting stem) projectile points are restricted to the Hudnut Phase at 45-OK-258. Types 11 (large, squared triangular, contracting stem) and 13 (large, squared triangular, non-contracting stem) projectile points occur in higher frequencies in the Hudnut Phase component but are also present in the later Coyote Creek Phase component. Types 8 (small, shouldered triangular, contracting stem) and 12

HISTORICAL TYPE CLASSIFICATION

DIVISION	LANCEOLATE		TRIANGULAR			
SERIES	SIMPLE	SHOULDERED	SIDE-NOTCHED	CORNER-REMOVED	CORNER-NOTCHED	BASAL-NOTCHED
TYPE	11 LARGE LANCEOLATE	12 LIND COULEE	41 COLD SPRINGS	51 NESPELEM BAR	61 COLUMBIA A Corner notched	71 QUILOMENE A Basal notched
	15 WINDUST C Contracting base	13 WINDUST A	42 PLATEAU Side notched	52 RABBIT ISLAND A	62 QUILOMENE Corner notched	72 QUILOMENE B Basal notched
	21 CASCADE A	14 WINDUST B		53 RABBIT ISLAND B	63 COLUMBIA B Corner notched	73 COLUMBIA STEM A
	22 CASCADE B	31 MAHKIN SHOULDERED				74 COLUMBIA STEM B
	23 CASCADE C				64 WALLULA Rectangular stemmed	75 COLUMBIA STEM C

Types are numbered consecutively within formal series; a two digit code indicates the approximate temporal sequence of defined series and types.

Type names are those most commonly applied. Mahkin Shouldered and Nespelem Bar are types defined for the Rufus Woods Lake project area.

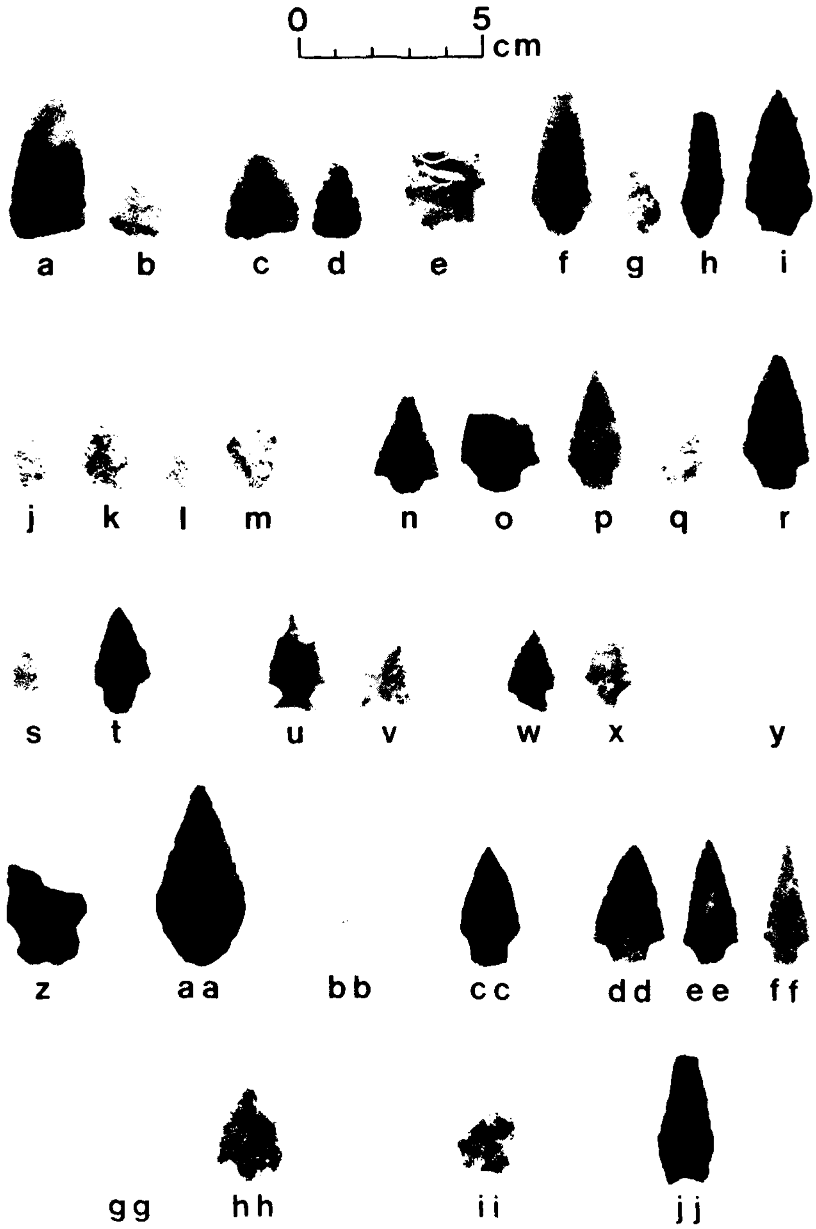
Figure 3-5. Historical projectile point types.

Table 3-20. Relationship of morphological and historical projectile point types, 45-OK-258.

Historical Type		Morphological Type and Code																	Total
Number	Name	1	2	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
		N1N1	N1N2	1NN2	N2NN	22NN	2121	2122	2111	2112	3121	3122	3131	3132	4121	4122	4131	4132	
15	Windust C	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
21	Cascade A	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	4
31	Shouldered lanceolate	-	-	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	4
42	Plateau side-notched	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
51	Nespelem Bar	-	-	-	1	1	13	17	2	1	1	3	1	1	-	-	-	-	41
52	Rabbit Island A	-	-	-	-	-	3	1	-	-	12	11	3	1	1	-	-	-	32
53	Rabbit Island B	-	-	-	-	-	-	2	-	-	-	2	-	-	-	-	-	-	4
61	Columbia Corner-notched A	-	-	-	-	-	-	-	-	-	2	-	6	1	-	-	-	-	9
62	Quilomene Bar Corner-notched	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2
63	Columbia Corner-notched B	-	-	3	-	-	-	-	-	1	-	-	1	12	-	-	-	2	19
64	Wallula Rectangular Stemmed	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	1	3
71	Quilomene Bar Basal-notched	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	4	1	7
74	Columbia Stemmed B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
75	Columbia Stemmed C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	7	8
81	Not Assigned	6	6	2	-	-	-	-	1	1	-	2	-	-	-	-	1	1	20
	Total	6	6	15	7	4	16	20	3	3	15	19	13	16	3	1	5	13	165

Table 3-21. Morphological projectile point types by zone and component, 45-OK-258.

Zone/Component	Morphological Type																	Total
	1	2	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1	-	1	2	-	-	-	3	-	1	2	1	-	3	-	-	1	1	15
2	3	1	12	1	-	-	5	-	-	1	7	2	8	-	1	-	10	51
Coyote Creek	3	2	14	1	-	-	8	-	1	3	8	2	11	-	1	1	11	66
3	1	1	-	1	1	7	5	1	-	1	6	6	1	-	-	3	-	34
4	2	2	-	-	1	4	4	-	-	7	2	2	2	1	-	-	-	27
5	-	-	-	1	-	-	-	2	-	3	1	-	-	1	-	1	1	10
6	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	2
Hudnut	3	3	-	2	2	12	9	3	-	12	9	8	3	2	-	4	1	73
Unassigned	-	1	1	4	2	4	3	-	2	-	2	3	2	1	-	-	1	26
Total	6	6	15	7	4	16	20	3	3	15	19	13	16	3	1	5	13	165


0 5 cm
a b c d e f g h i
j k l m n o p q r
s t u v w x y
z aa bb cc dd ee ff
gg hh ii jj

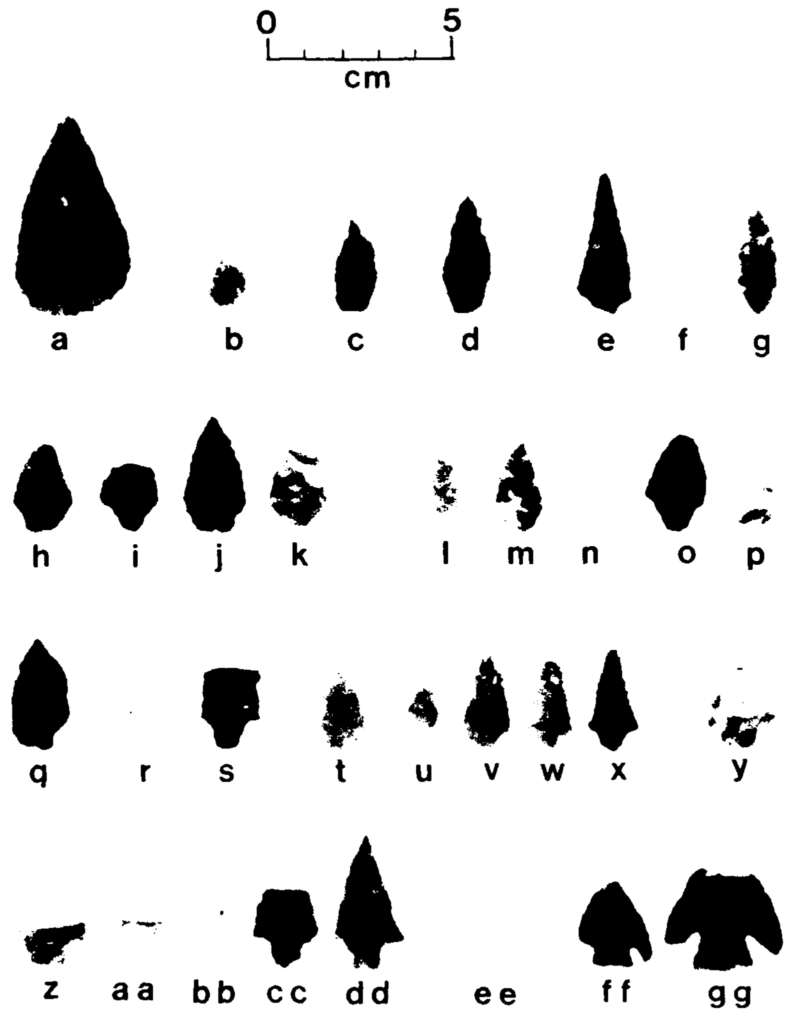
	Master Number	Morphological Type	Historical Type	Provenance	Zone	Material
a.	1079	1	Unassigned	4N47W/Fe301/165	4	Jasper
b.	1966	1	Unassigned	0N34W/Fe205/95	4	Fine-grained basalt
c.	1490	2	Unassigned	5N47W/Fe301/185	4	Chalcedony
d.	506	2	Unassigned	7N69W/Fe7/170	4	Jasper
e.	2023	6	Nespelem Bar	2S35W/Fe500,501/160	4	Opal
f.	1511	7	Rabbit Island A	5N45W/Fe301/180	4	Chalcedony
g.	1616	7	Nespelem Bar	2N51W/Fe300/155	4	Opal
h.	1793	7	Nespelem Bar	1S40W/180	4	Jasper
i.	1936	7	Nespelem Bar	3S39W/Fe153/200	4	Basalt
j.	1501	8	Nespelem Bar	5N46W/Fe301/170	4	Jasper
k.	246	8	Nespelem Bar	1N41W/170	4	Jasper
l.	2103	8	Nespelem Bar	4S35W/Fe204/140	4	Jasper
m.	1985	8	Rabbit Island A	1S34W/Fe205/130	4	Jasper
n.	1523	11	Rabbit Island A	5N44W/Fe301/220	4	Jasper
o.	481	11	Rabbit Island A	8N69W/Fe7/150	4	Jasper
p.	509	11	Rabbit Island A	10N60W/60	3	Jasper
q.	911	11	Rabbit Island A	6N48W/Fe301/195	4	Jasper
r.	1435	11	Rabbit Island A	5N50W/Fe301/185	4	Indeterminate
s.	1739	12	Rabbit Island B	0N40W/Fe500/170	4	Jasper
t.	1967	12	Rabbit Island A	0N34W/Fe205/115	4	Fine-grained basalt
u.	511	13	Columbia corner-notched A	10N60W/80	4	Jasper
v.	371	13	Columbia corner-notched A	14N64W/Fe3/110	4	Jasper
w.	322	14	Columbia corner-notched B	1S44W/150	4	Jasper
x.	362	14	Rabbit Island A	14N64W/100	4	Jasper
y.	2020	15	Rabbit Island A	2S35W/Fe500/155	4	Chalcedony
z.	2120	9	-	5S35W/Fe24/170	5	Fine-grained basalt
aa.	1745	5	Cascade A	0N40W/Fe501/195	5	Jasper
bb.	2448	7	Nespelem Bar	4S26W/100	6	Jasper
cc.	1954	9	Nespelem Bar	3S39W/Fe501/220	5	Fine-grained basalt
dd.	1257	11	Rabbit Island A	1S47W/Fe302/130	5	Jasper
ee.	2405	11	Rabbit Island A	2N30W/Fe200/40	5	Jasper
ff.	1796	11	Rabbit Island A	1S40S/Fe501/200	5	Jasper
gg.	2093	15	Quilomene Bar basal-notched A	4S36W/Fe24/200	5	Jasper
hh.	825	17	Quilomene Bar basal-notched A	7N41W/110	5	Jasper
ii.	2460	11	Rabbit Island A	0N26W/30	6	Jasper
jj.	2532	5	Windust C	Beach	0	Fine-grained basalt

KEY

Master Number:
Morphological Type:
Historical Type:

Provenience:
Zone:
Material:

Plate 3-3. Examples of projectile points, Zones 4, 5, and 6, 45-OK-258 (except **jj.**, unzoned).


0 5
cm
a b c d e f g
h i j k l m n o p
q r s t u v w x y
z aa bb cc dd ee ff gg

a. 2039
1
Unassigned
[illegible]S34W/Fe88/100
3
Chalcedony

b. 1335
2
Unassigned
2N49W/Fe300/140
3
Jasper

c. 859
5
Cascade A
7N45W/Fe300/130
3
Argillite

d. 241
6
Mahkin Shouldered
1N41W/100
3
Fine-grained basalt

e. 1238
7
Rabbit Island A
0N47W/Fe72/90
3
Jasper

f. 341
7
Nespelem Bar
1S43W/110
3
Jasper

g. 355
7
Nespelem Bar
14N64W/80
3
Jasper

h. 1209
7
Nespelem Bar
1S50W/60
3
Jasper

i. 1158
7
Nespelem Bar
0N51W/70
3
Jasper

j. 1026
7
Nespelem Bar
6N54W/80
3
Jasper

k. 1581
7
Nespelem Bar
3N51W/Fe300/110
3
Opal

l. 1015
8
Nespelem Bar
6N50W/Fe300/140
3
Jasper

m. 1333
8
Nespelem Bar
2N49W/Fe300/140
3
Jasper

n. 1614
8
Nespelem Bar
2N51W/Fe300/130
3
Opal

o. 180
8
Nespelem Bar
1S61W/70
3
Fine-grained basalt

p. 2015
8
Nespelem Bar
2S35W/140
3
Opal

q. 170
9
Nespelem Bar
0N61W/70
3
Jasper

r. 1958
11
Columbia
corner-notched A
0N35W/55
3
Jasper

s. 2040
11
Rabbit Island A
2S34W/Fe500/110
4
Jasper

t. 354
12
Rabbit Island A
14N64W/80
3
Jasper

u. 1002
12
Rabbit Island A
6N51W/Fe300/170
3
Jasper

v. 1146
12
Rabbit Island A
1N47W/Fe300/80
3
Opal

w. 68
12
Rabbit Island A
6N38W/80
3
Jasper

x. 1652
12
Rabbit Island B
0N45W/60
3
Jasper

y. 2423
13
Columbia
corner-notched A
0N28W/Fe200/65
3
Jasper

z. 1167
13
Nespelem Bar
0N51W/100
3
Jasper

aa. 567
14
Columbia
corner-notched B
7N51W/60
3
Jasper

bb. 1162
13
Rabbit Island A
0N51W/80
3
Opal

cc. 1242
13
Rabbit Island A
0N47W/Fe69/100
3
Jasper

dd. 636
13
Rabbit Island A
2S66W/Fe51/200
3
Jasper

ee. 967
13
Columbia
corner-ntoched A
7N51W/Fe34/100
3
Chalcedony

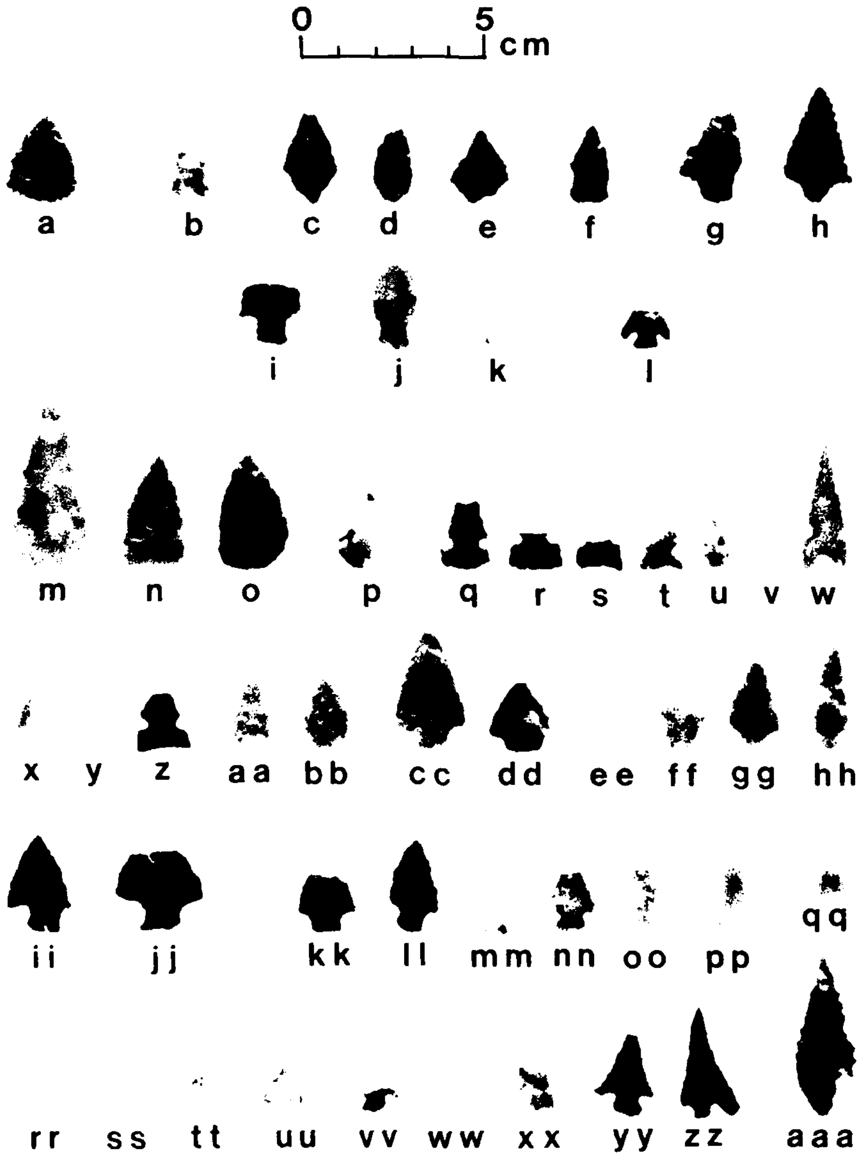
ff. 633
17
Quilomene Bar
basal-notched A
2S66W/Fe13/130
3
Jasper

gg. 643
17
Quilomene Bar
basal-notched A
2S65W/Fe400/110
3
Jasper

KEY

Master Number:
Morphological Type:
Historical Type:
Provenience:
Zone:
Material:

Plate 3-4. Examples of projectile points, Zone 3, 45-OK-258 (except **s.**, from Zone 4).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a b c d e f g h
i j k l
m n o p q r s t u v w
x y z aa bb cc dd ee ff gg hh
ii jj kk ll mm nn oo pp qq
rr ss tt uu vv ww xx yy zz aaa

	Master Number	Morphological Type	Historical Type	Provenience	Zone	Material
a.	604	2	Unassigned	0N66W/50	1	Jasper
b.	1225	4	Plateau side-notched	0N47W/10	1	Jasper
c.	274	8	Nespelem Bar	0N44W/10	1	Jasper
d.	1574	8	Nespelem Bar	3N51W/30	1	Opal
e.	2134	8	Nespelem Bar	0N32W/Fe200/75	1	Jasper
f.	676	10	Columbia corner-notched B	10N50W/50	1	Jasper
g.	2439	11	Columbia corner-notched A	4S28W/Fe200/15	1	Jasper
h.	2283	11	Rabbit Island A	4S31W/Fe20015	1	Jasper
i.	743	14	Columbia corner-notched A	8N49W/30	1	Jasper
j.	184	14	Columbia corner-notched B	4N68W/60	1	Chalcedony
k.	2244	14	Columbia corner-notched B	3S31W/Fe200/25	1	Chalcedony
l.	913	18	Columbia stemmed C	6N47W/80	1	Jasper
m.	883	1	Unassigned	7N50W/Fe34/100	2	Chalcedony
n.	1265	1	Unassigned	0N49W/50	2	Jasper
o.	1324	1	Unassigned	2N49W/30	2	Jasper
p.	1394	2	Unassigned	4N49W/Fe62/60	2	Chalcedony
q.	2248	4	Plateau side-notched	3S31W/Fe201/45	2	Jasper
r.	1354	4	Plateau side-notched	3N48W/40	2	Jasper
s.	2318	4	Plateau side-notched	4S31W/Fe201/40	2	Fine-grained basalt
t.	1145	4	Columbia corner-notched B	1N47W/50	2	Jasper
u.	2288	4	-	4S31W/Fe8/40	2	Jasper
v.	2348	4	Plateau side-notched	2S30W/Fe20[illegible]/45	2	Chalcedony
w.	1585	4	Plateau side-notched	3N50W/Fe57/70	2	Chalcedony
x.	1057	4	Plateau side-notched	6N52W/Fe36/130	2	Chalcedony
y.	954	4	Plateau side-notched	6N49W/80	2	Chalcedony
z.	2250	4	Plateau side-notched	3S31W/Fe201/45	2	Fine-grained basalt
aa.	1448	8	Nespelem Bar	5N52W/40	2	Jasper
bb.	756	8	Nespelem Bar	9N47W/20	2	Jasper
cc.	822	11	Rabbit Island A	7N42W/80	2	Jasper
dd.	640	12	Rabbit Island A	2S65W/90	2	Argillite
ee.	123	12	Rabbit Island A	5N56W/80	2	Jasper
ff.	824	12	Rabbit Island A	7N41W/90	2	Jasper
gg.	831	12	Rabbit Island A	7N43W/90	2	Jasper
hh.	1387	12	Wallula rectangular stemmed	4N49W/60	2	Jasper
ii.	188	13	Columbia corner-notched A	4N68W/Fe5/100	2	Jasper
jj.	1201	13	Quilomene Bar corner-notched	1S50W/Fe65/10	2	Jasper
kk.	1685	14	Columbia corner-notched B	0N42W/80	2	Jasper
ll.	1694	14	Columbia corner-notched B	0N42W/120	2	Jasper
mm.	2375	14	Columbia corner-notched B	3S30W/Fe201/55	2	Chalcedony
nn.	1555	14	Columbia corner-notched B	4N50W/50	2	Jasper
oo.	2324	14	Columbia corner-notched B	4S31W/Fe8/45	2	Jasper
pp.	2138	14	Wallula rectangular stemmed	1S33W/Fe200/100	2	Chalcedony
qq.	1182	16	Columbia stemmed C	1S51W/80	2	Chalcedony
rr.	1438	18	Columbia stemmed C	5N51W/40	2	Chalcedony
ss.	2374	18	Columbia stemmed C	3S30W/Fe201/55	2	Chalcedony
tt.	1381	18	Columbia stemmed C	4N49W/50	2	Jasper
uu.	1348	18	Columbia stemmed C	3N49W/30	2	Chalcedony
vv.	2252	18	Columbia stemmed C	3S31W/Fe202/50	2	Chalcedony
ww.	2125	18	Wallula rectangular stemmed	4S34W/40	2	Chalcedony
xx.	2319	18	Columbia corner-notched B	4S31W/Fe201/40	2	Chalcedony
yy.	930	18	Columbia corner-notched B	7N49W/Fe20/90	2	Jasper
zz.	1305	18	Columbia stemmed B	1N49W/20	2	Jasper
aaa.	857	5	Nespelem Bar	7N45W/80	2	Chalcedony

KEY
Master Number:
Morphological Type:
Historical Type:
Provenience:
Zone:
Material:

Plate 3-5. Examples of projectile points, Zones 1 and 2, 45-OK-258.

(small, squared triangular, non-contracting stem) are represented in equal proportions in both components. Types 14 (small, squared triangular, non-contracting stem) and 18 (small, barbed triangular, non-contracting stem) occur in much higher frequencies in the later Coyote Creek Phase. Only Type 4 (small, side-notched) are restricted to the Coyote Creek Phase.

This discussion suggests that morphological Types 4 and 7 are the most useful time indicators. Type 18, of which all but one are from the Coyote Creek Phase component, may also be a good time indicator. All other types persist through both phases at the site, although their relative frequencies change.

In order to further investigate the chronology of morphological projectile point types, several morphological characteristics have been selected for comparison (Table 3-22). Dimensions D6, D7, and D9 through D11, blade edge shape, cross section, edge grinding, basal edge thinning, and flake scar patterns were excluded because in each case, over two-thirds of the individual examples shared the same attributes, often indeterminate, thus providing too little diversity for consideration.

Not all morphological dimensions lend themselves equally well to comparison between components. For example, in D2 (outline) over 20% of the projectile point outlines are classified as N (not applicable). This makes it virtually impossible to compare frequencies of triangular and lanceolate outlines. In Dimension D5 (basal edge shape) 10-30% of the points are classified as indeterminate, presenting the same problem.

Several temporal trends are apparent in the distribution of the remaining morphological characteristics. In Dimension 1 (blade-stem juncture), shouldered projectile points occur in a much higher frequency in the Hudnut component. Squared points are more frequent in the Hudnut component than in the Coyote Creek Phase, but the difference is rather small. Projectile points without blade-stem junctures, i.e. unstemmed points, occur in equal frequencies. This group includes both lanceolate and unnotched, unstemmed, triangular projectile points. Barbed points are more frequent in the later Coyote Creek component, and side-notched points predominate.

Dimension 3 (stem edge orientation) appears to change much between components. Both straight stemmed and contracting stemmed projectile points are more frequent during the earlier Hudnut component. Unstemmed and expanding stem projectile points, on the other hand, are more frequent in the later Coyote Creek component.

In D4 (size) change is readily apparent. Large projectile points are much more frequent in the Hudnut component, while small projectile points are much more frequent in the Coyote Creek component. This change is apparent between zones as well as components.

The distribution of morphological characteristics discussed above does not follow that suggested by other Columbia Plateau researchers (cf. Butler 1961, 1962; Nelson 1969; Leonhardy 1970; Leonhardy and Rice 1970; Rice 1969, 1972; Swanson 1966). For example, small, shouldered or squared triangular, contracting stem points should not occur in each component in equal frequencies. Instead, they should be more frequent in the later Coyote Creek

Table 3-22. Selected morphological characteristics of projectile points by zone and component, 45-OK-258.

Dimension	Mode	Zone/Component								Total
		1	2	Coyote Creek Total	3	4	5	6	Hudnut Total	
D1. Blade-stem Juncture	N. Not separate	1	7	8	3	4	1	-	8	16
	1. Side-notched	2	10	12	-	-	1	-	1	13
	2. Shouldered	4	5	9	14	9	1	1	25	34
	3. Squared	6	18	24	14	13	4	1	32	56
	4. Barbed	2	11	13	3	1	3	-	7	20
D2. Outline	N. Not applicable	2	12	14	-	-	1	-	1	15
	1. Triangular	13	38	51	32	26	8	2	68	119
	2. Lanceolate	-	1	1	2	1	1	-	4	5
D3. Stem Edge Orientation	N. Not applicable	3	17	20	4	5	1	-	10	30
	1. Straight	1	3	4	7	2	2	-	11	15
	2. Contracting	6	14	20	19	18	5	2	44	64
	3. Expanding	4	17	21	4	2	2	-	8	29
	9. Indeterminate	1	-	1	-	-	-	-	-	1
D4. Size	N. Not applicable	-	1	1	2	1	1	-	4	5
	1. Large	3	6	9	20	15	7	2	44	53
	2. Small	12	44	56	12	11	2	-	25	81
D5. Basal Edge Shape	1. Straight	3	15	18	8	6	2	1	17	35
	2. Convex	8	24	32	22	11	4	1	38	70
	3. Concave	1	4	5	-	-	1	-	1	6
	4. Point	1	1	2	1	2	-	-	3	5
	5. 1 or 2 and notched	-	2	2	1	-	1	-	2	4
	9. Indeterminate	2	5	7	2	8	2	-	12	19
D6. Serration	1. Not serrated	10	33	43	18	13	8	2	41	84
	2. Serrated	2	6	8	8	10	2	-	20	28
	9. Indeterminate	3	12	15	8	4	-	-	12	27

component. Also, the relatively high frequencies of unstemmed projectile points in the Coyote Creek differs from the distribution expected. These results are probably attributable, at least in part, to the low number of individuals per class and the disturbed nature of the archaeological deposit.

Historical Projectile Point Types

Historical projectile point types from 45-OK-258 are presented in Table 3-23. Of the 23 historical types identified at the Chief Joseph Dam Cultural Resources Project, 15 are present at this site. All six of the historical projectile point series are represented here. Historic types include from one to 41 specimens. The six cultural zones contain from two to 51 projectile points. Small sample sizes make chronological comparisons of historical projectile point distributions between zones difficult. Therefore, the following discussion is limited to a comparison between the Hudnut component, dated at this site from 3600 to 2400 B.P. and the Coyote Creek component, dated here from 800 B.P. to approximately 150 B.P. Information on the representation of the types in project assemblages is taken from Lohse (1985).

Only two historical projectile point types, Cascade A (Type 21) and Mahkin Shouldered (Type 31), are restricted to the Hudnut component at 45-OK-258. These two types include only three specimens. Cascade A is a common variant of the classic Cascade projectile point defined by Butler (1961, 1962, 1965). A total of 61 projectile points of this type are included in the Chief Joseph Dam project collection. Their temporal distribution here is approximately 8000-4000 B.P., Kartar Phase.

The Mahkin shouldered lanceolate projectile point is one of the 93 specimens from the project. A common form of projectile point recovered in excavations across the Columbia Plateau, this type has never been formally defined. Type sites include Windust Caves (Rice 1965) and Marmes Rockshelter (Rice 1969, 1972), as well as 45-OK-11 (Lohse 1985). With a temporal distribution of 8000-3500 B.P., the type is characteristic of the later part of the Kartar Phase, and also found in early Hudnut Phase components.

Historical projectile point types occurring in relatively higher frequencies in the Hudnut Component, but persisting into the Coyote Creek component, include Nespelem Bar (Type 51), Rabbit Island A (Type 52), and Quilomene Bar basal-notched A (Type 71). The 33 Nespelem Bar projectile points are part of a total of 198 specimens from the project. The type includes slightly shouldered, triangular projectile points with straight to contracting stems. This form has previously been subsumed under the Rabbit Island Stemmed series as a common, although indistinct, variant (cf. Nelson 1969). This type has been defined on the basis of specimens from 45-OK-11 (Lohse 1984f) and 45-OK-258. The temporal distribution, approximately 5000-3000 B.P., spans the late Kartar and early to middle Hudnut Phases.

The 31 examples of Rabbit Island A (Type 52) projectile points from this site are among 140 specimens collected by the project. The type was first identified by Daugherty (1952) and Crabtree (1957), and more fully described by Swanson (1962) and Nelson (1969). This point type is common across the

Table 3-23. Historical projectile point types by zone and component, 45-OK-258.

Zone/Component		Historic Type[1]															Total
		15	21	31	42	51	52	53	61	62	63	64	71	74	75	81[2]	
1		–	–	–	1	3	2	–	2	–	4	–	–	–	1	2	15
2		–	–	–	8	6	5	1	1	1	11	3	1	1	6	7	51
Coyote Creek[3]	N	–	–	–	9	9	7	1	3	1	15	3	1	1	7	9	66
	%	–	–	–	15.8	15.8	12.3	1.8	5.3	1.8	26.3	5.3	1.8	1.8	12.3		
3		–	1	1	–	14	8	1	3	–	1	–	3	–	–	2	34
4		–	–	–	–	8	11	1	2	–	1	–	–	–	–	4	27
5		–	1	–	–	1	4	–	–	–	–	–	2	–	1	1	10
6		–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	2
Hudnut[3]	N	–	2	1	–	24	24	2	5	–	2	–	5	–	1	7	73
	%	–	3.0	1.5	–	36.4	36.4	3.0	7.6	–	3.0	–	7.6	–	1.5		
Unassigned		1	2	3	1	8	1	1	1	1	2	–	1	–	–	4	26
Total		1	4	4	10	41	32	4	9	2	19	3	7	1	8	20	165

1. See Figure 3-5 for names of historical types.
2. Untyped.
3. Percentages calculated for component totals excluding untyped points.

central and northern Columbia Plateau at about 4000 B.P. Type sites are the Shalkop site (Swanson 1962) and Sunset Creek site (Nelson 1969). The temporal distribution at our project is ca. 4000-2000 B.P., and it is confined to the Hudnut Phase.

Six examples of Quilomene Bar basal-notched A projectile points, previously described by Nelson (1969) are among 23 such points from the project. These are large, thick, heavy projectile points with convex to straight blade margins. In the project area this type appears at approximately 2500 B.P. and continues for at least another 1000 years, spanning the transition from the Late Hudnut to the early Coyote Creek Phase.

Two historical projectile point types, Rabbit Island B (Type 53) and Columbia Corner-notched A (Type 61), are distributed relatively evenly between the two components. The three Rabbit Island B specimens are among 93 such projectile points from the project. This smaller, more delicate version of the Rabbit Island stemmed point type has not been formally defined, but occurs consistently in later cultural contexts than the Rabbit Island A variant. It has been found at the Shalkop site (Swanson 1962), the Sunset Creek site (Nelson 1969), and at Wanapum Dam (Greengo 1982). Temporal distribution is approximately 3000-1500 B.P., mostly the later part of the Hudnut Phase but also encompassing the early Coyote Creek Phase.

Of 77 Columbia Corner-notched A projectile points, eight were recovered at 45-OK-258. This form was most fully described by Nelson (1969) and Leonhardy (1970). Type sites include Marmes Rockshelter (Rice 1969, 1972), Granite Point locality (Leonhardy 1970), Sunset Creek site (Nelson 1969), and Wanapum Dam (Greengo 1982). Temporal distribution is approximately 4000-2000 B.P. and mostly confined to the Hudnut Phase.

Two historical projectile point types, Columbia Corner-notched B (Type 63) and Columbia Stemmed C (Type 75) occur in small relative frequencies in the Hudnut component and in large relative frequencies in the Coyote Creek component. The 17 Columbia Corner-notched B points from 45-OK-258 are part of a collection of 108 specimens from the Chief Joseph Dam project. These are smaller versions of the Columbia Corner-notched A type, and they share type sites with the latter, with the exception of Marmes Rockshelter. Columbia Corner-notched B projectile points characterize the last 2000 years of the archaeological record (ca. 2000-150 B.P.), representative of a carry-over of the Columbia Corner-notched type into the Coyote Creek Phase of the Rufus Woods Lake project area.

The eight Columbia Stemmed C projectile points from the site are part of a collection of 40 Columbia Stemmed C specimens from the project. Type C variants are quite similar to both Type A and Type B variants. They do, however, tend to be smaller, more squat, and have open basal notches with laterally extending barbs instead of downward projecting ones of the other two variants. They are found in contexts dated ca. 1500-150 B.P. They occur in the middle and late Coyote Creek Phase.

Only 14 of 123 projectile ponts, representing four historical types, are restricted to the Coyote Creek component at 45-OK-258. Included are Plateau Side-notched (Type 42), Quilomene Corner-notched (Type 62), Wallula

Rectangular Stemmed (Type 64), and Columbia Stemmed B (Type 74). Nine Plateau side-notched projectile points represent a type that has a wide distribution across all of western North American. On the Columbia Plateau, they are generally labelled small side-notched, Plateau side-notched, or Columbia side-notched. In the project area, temporal distribution is restricted to the last 1500 years and the Coyote Creek Phase.

The single example of a Quilomene Corner-notched projectile point is among 34 specimens from the project. First defined by Nelson (1969), this type seems to appear in the archaeological record about 3000 B.P. Nelson (1969) also suggests that these forms continue well past 2000 B.P., with the latest examples exhibiting a basally notched stem. Type sites include Marmes Rockshelter (Rice 1969, 1972), Sunset Creek (Nelson 1969), and Wanapum Dam (Greengo 1982). These points are confined to the latter part of the Hudnut Phase in the Rufus Woods Lake project area.

There are three examples of Wallula Rectangular Stemmed points from 45-OK-258. These are distinctive, small, delicate, triangular projectile points first identified and described by Osborne et al. (1952) and Crabtree (1957). However, the type was formally defined first by Shiner (1961). The Wallula Rectangular Stemmed type is most common on the lower reaches of the Columbia River, but does occur at least as far north as Kettle Falls in limited number. Temporal distribution is 2000-1500 B.P., within the Coyote Creek Phase.

A single Columbia Stemmed B projectile point is one of only seven specimens from the project area. This type is similar to the Type A variants, with more open basal notches, a lack of squared barbs, and several other occasional variations. There appears to be no temporal disjunction between Type B and Type A variants, and both types are restricted to the Coyote Creek Phase.

The distribution of the above discussed historical projectile point types does not correspond directly with time ranges presented in the above discussion. These time ranges are based on securely dated specimens from all 18 excavated sites, including 45-OK-258. Many of the projectile points from this site, however, are from excavation levels assigned to zones and, secondarily to components, based on the natural stratigraphy and cultural inclusions in the natural deposits.

Figure 3-6 illustrates the relationship between the radiocarbon dated ranges of historic projectile point types and their assignments to components at the site. The earlier Hudnut Phase component, dated from approximately 3600-2400 B.P., includes 66 projectile points. The time range of 61 (92.4%) of the projectile points places them in the Hudnut Phase. Two (3.0%) additional specimens are assigned to an earlier phase. They may be present in the assemblage because they were deposited there by Hudnut Phase occupants or they may indicate an earlier, undated occupation. Neither projectile point is from the lowest zone, and the first explanation seems to be more appropriate. Three (4.5%) more projectile points are assigned to historic types restricted chronologically to the later Coyote Creek Phase. The low relative frequencies of these later projectile points present no major problem, as bioturbation

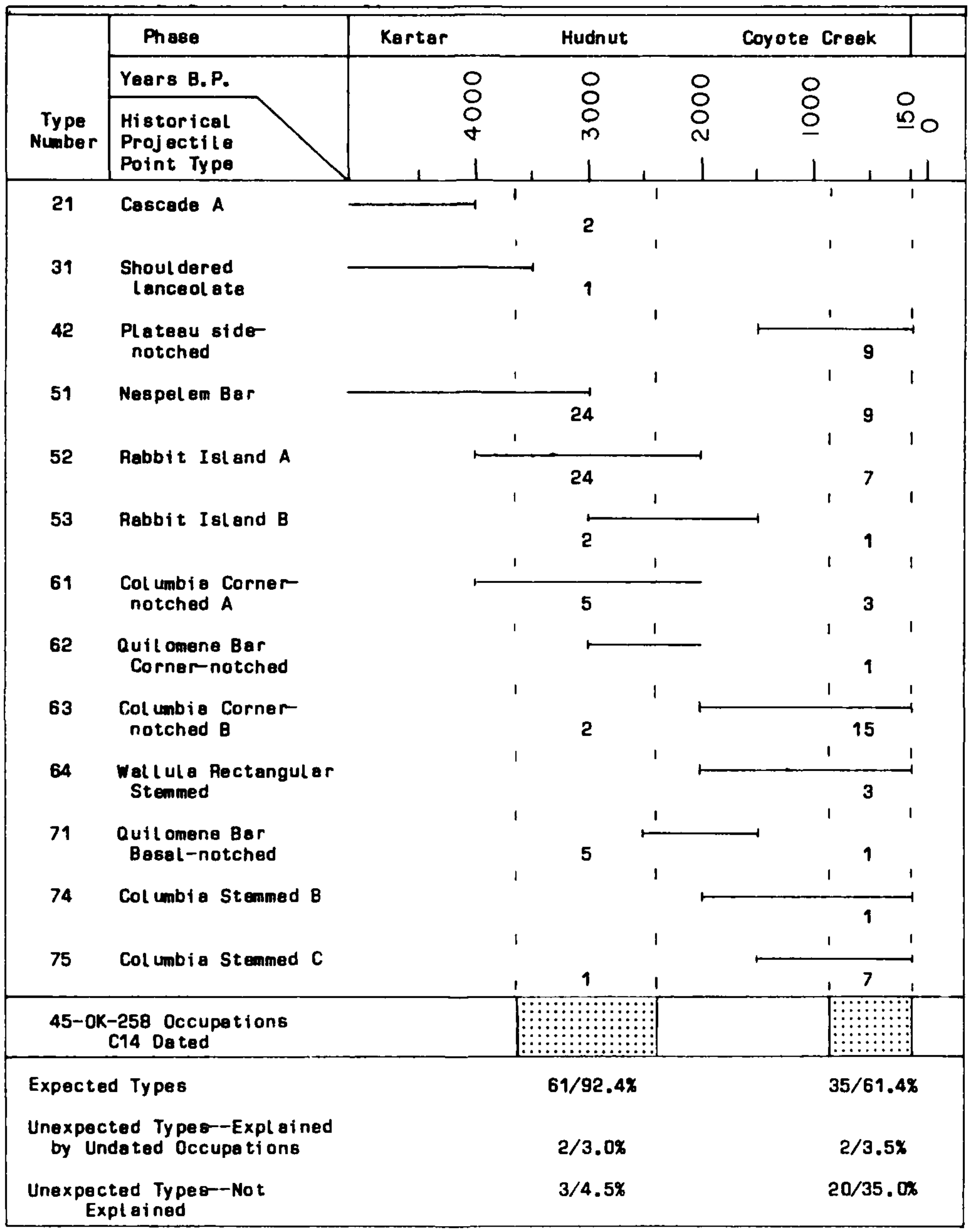


Figure 3-6. Expected distribution (bars) and actual occurrence (numbers) of historical projectile point types, 45-OK-258.

caused much mixing of the matrix, and two of the three specimens are located in Zone 3, directly below the Coyote Creek component.

A total of 57 projectile points are assigned to the Coyote Creek component. Radiometric dates place this occupation in the later part of the Coyote Creek Phase. Only 35 (61.4%) of these projectile points, however, have a chronological distribution compatible with the dated occupation. Two (3.5%) additional points should occur during early Coyote Creek Phase, and may indicate an undated occupation between the dated Hudnut and late Coyote Creek components. However, 20 (35%) projectile points belong to historic types that predate the dated late Coyote Creek component by over 1,000 years.

The discrepancy between expected and actual projectile point type occurrences in the late Coyote Creek component at 45-OK-258 can be explained in three ways. The problem may be partially due to mis-assignment of 10-cm excavation levels to zones and components, and partially due to prehistoric mixing of cultural occupational debris.

Assignments of excavation levels to archaeological zones presented a problem. Many levels could not be assigned because the 2 x 2 m units were excavated in isolation, that is apart from block excavations. Furthermore, natural depositional sequences in this low terrace environment were not nearly as simple as indicated in Chapter 2, Table 2-2, and prehistoric cultural activity at times obscured the natural stratigraphy. Much of this difficulty was solved by placing ambiguous unit levels in the category "Unassigned". This matrix includes four out-of-sequence radiocarbon dates (Table 2-2) and almost 22,000 artifacts, including 22 typed projectile points. However, it probably did not completely prevent assigning some mixed levels to one phase or the other. Most of the unexpected stylistic distribution occurs in the late Coyote Creek components. In fact, seven out of 21 misplaced projectile points (Styles 51, 52, 61, and 62) are from Zone 1, the latest site occupation, indicating that the displacement is not due totally to misassigning the top levels of the much older Hudnut component.

Extensive cultural mixing of natural and cultural deposits occurred throughout both the earlier Hudnut Phase and the later Coyote Creek Phase because of the construction of semi-subterranean pit houses and other activities carrried on during extended occupation of the site. During the Hudnut occupations, at least three and possibly four pithouses were constructed. Only one house, Housepit 2, was constructed during Coyote Creek occupations. This house intersects the eastern edge of Housepit 5, assigned to the Hudnut component by radiometric dating. Part of the matrix from the area of contact between these two housepits is included in the unassigned category because of the extreme mixing of cultural materials. However, somewhat mixed matrices were included in the late component if the majority of the contents warranted this assignment. This is probably the major cause of the unexpected stylistic distribution.

Much of the mixed nature of the Coyote Creek component, then, can be attributed to cultural disturbances caused by the construction of the late component housepit and other cultural activities during the late occupations of the site. Although this mixing does cause a problem in an investigation of

chronological changes of morphological and stylistic projectile point types, it does not affect the analysis of features and feature content because features were assigned individually to zones.

COBBLE TOOLS

Cobble tools were analyzed in the standard technological and functional analyses applied to project sites. An additional analysis of cobble tools was prompted by the unusually large and diverse cobble tool assemblages present at 45-OK-11 and 45-OK-258, and applied to several of the largest site assemblages. This section presents an overview of cobble tools from 45-OK-258. The presentation serves as a guide to the data available to researchers, not as an exhaustive discussion and interpretation. The data available to the author did not permit a breakdown of the analysis by zone and component.

The cobble tool classification is based on a paradigmatic classification much like those used in the previously described technological and functional analyses. Differences include a larger number of functional types established for cobble tools, and more associated dimensions and attributes keyed to descriptions of cobble tools forms. Table 3-24 presents a complete list of classificatory dimensions and attributes.

Our attempt to describe the cobble tool assemblage is only partly successful. We can describe tools types by diagnostic attributes of manufacture, wear, and overall configuration. We cannot adequately establish the relationship of manufacture and wear on an individual cobble. These objects are asymmetrical, lack obvious, consistent landmarks, and exhibit endless variation in shape and in the number and association of discrete patterns of wear and manufacture. Obvious examples of each are present, but the majority of cobble tools fall into the grey area between them. By describing the obvious morphological characteristics and diagnostic elements of manufacture and wear, we will be able to sort out patterns comparable to those defined by prior researchers. However, unless we wish to describe each specimen, we are forcing a broad range of variation into strictly confined categories. These may not reflect the actual use of the objects. Moreover, most of the these objects were used for more than one task. Some tasks required purposeful shaping of the cobble, but most could be done with any available round rock.

It might be argued that diagnostics presented here are products of sustained, controlled use. Facets, bevelled facets, well, etc., on the other hand, may be byproducts of function rather than manufactured or functionally designed features. The number of separate wear pattern typical of each cobble tool support this argument. In the following discussion, however, we have assigned each cobble to a single manufacture or wear classification regardless of the number of identical, separate areas of manufacture or wear on the object. Separate tools are counted only if areas of manufacture of wear are distinctly different.

Excavations at 45-OK-258 yielded 174 classifiable cobble tools (Table 3-25). Objects range from a whetstone classified as an abrader, an adze-like

Table 3-24. Cobble tool classification.

DIMENSION I: OBJECT TYPE

- Utilized flake
- Unifacially retouched flake
- Bifacially retouched flake
- Resharpening flake
- Utilized spall
- Core
- Anvil
- Biface
- Chopper
- Edge ground cobble
- Hammerstone
- Hopper mortar base
- Maul
- Millingstone
- Mortar
- Net weight
- Peripherally flaked cobble
- Pestle
- Tabular knife
- Indeterminate

DIMENSION II: MATERIAL

- Basalt
- Quartzite
- Granitic
- Porphrytic
- Other

DIMENSION III: SIZE

- Length - mm
- Width - mm
- Thickness - mm

DIMENSION IV: TOOL AREAS (1-8)

DIMENSION V: WEAR AREAS (1-8)

DIMENSION VI: MANUFACTURE

- Flaked surface
- Flaked edge/margin
- Flaked end
- Pecked surface
- Pecked edge/margin
- Pecked end
- Ground surface
- Ground edge/margin
- Ground end
- None
- Indeterminate

DIMENSION VII: DIAGNOSTIC OF MANUFACTURE

- Unifacial edge
- Bifacial edge
- Facet
- Beveled facet
- Convex surface
- Flat surface
- Concave surface
- Point
- Notch
- Girdle
- Well
- None
- Other

DIMENSION VIII: WEAR LOCATION-NO MANUFACTURE

- Surface
- Edge (natural or flaked)
- End
- Margin
- Not applicable

DIMENSION IX: WEAR

- Polishing
- Smoothing
- Battering
- Crushing
- Abrasion
- Grinding
- Flaking
- None
- Indeterminate

DIMENSION X: WEAR LOCATION-MANUFACTURE

- Proximal edge
- Distal edge
- Lateral edge
- Adjacent edge
- Separate
- Whole facet
- Partial facet
- Not applicable/Indeterminate

DIMENSION XI: WEAR LOCATION-COBBLE

- Cortex
- Interior
- Interface
- Not applicable/Indeterminate

Table 3-25. Cobble tool type by material type, 45-OK-258.

Cobble Tool Type	Material					Total
	Basalt	Quartzite	Granitic	Porphyritic	Other	
Abrader	-	-	-	-	1	1
Adze	-	-	-	-	1	1
Anvil	1	-	7	-	5	13
Chopper	6	7	6	-	3	22
Flake/Spall	10	4	5	-	1	20
Pestle	2	-	1	-	1	4
Maul	2	-	1	-	-	3
Millingstone	5	-	3	-	1	9
Mortar	1	-	-	-	-	1
Hopper Mortar Base	-	-	3	-	2	5
Net Weight	-	-	1	-	-	1
Peripherally Flaked Cobble	-	-	-	-	1	1
Tabular Knife	-	-	1	-	-	1
Hammerstone	9	11	35	3	25	83
Edge Ground Cobble	-	-	1	-	2	3
Utilized Only	1	-	-	-	1	2
Indeterminate	-	-	2	-	1	3
Total N	37	22	67	3	45	174
%	21.3	12.6	38.5	1.7	25.9	100.0

preform, and a girdled net weight, to flake/spall objects. Fleshers or axes are absent. Hammerstones make up almost one half of the assemblage. Cobbles and flakes/spalls are present in relative frequencies of over 10 percent. The remaining 14 tool types (82% of all 17 types) include only 28% of the all individual objects.

All of the four lithic material types included in the classification, are represented at the site. Granite is most abundant, followed by basalt and, in much smaller amounts, quartzite. Very little porphyritic igneous stone is present, but just over one-quarter of the cobble tools are made from other materials. These frequencies may mirror the materials most readily available along a river located in a canyon surrounded by granitic rocks with basalt available a few miles south of the river.

The most numerous cobble tools, hammerstones, are made primarily from granite and other material, with basalt and quartzite also used. The only porphyritic cobble tools are hammerstones. The diversity of materials suggests that all materials present among the river were utilized with little selection.

Anvils also appear to indicate some preference for granitic rocks. Over one-half of the millingstones, however, are made of basalt. This indicates a definite preference for basalt, perhaps because this fine-grained, hard material is well suited to milling activities. Flake/spall cobble tools also show selection for basalt. This may be due to the large number of basalt flakes available on sites in the project area. Basalt is used for numerous activities, including tool manufacture and firing of rocks. In both cases, this hard rock splinters easily, leaving much debris around, even though whole basalt cobbles are not as readily available as granite cobbles.

Two-thirds of the choppers consist of basalt and quartzite in equal frequencies, but this is expected because these materials are harder and much easier to flake. Choppers, after all, are mostly manufactured tools while anvils, hammerstones, and millingstones need not be manufactured to be of use.

Table 3-26 shows the type of manufacture found on cobble tools. Each separate area of manufacture is identified, and therefore, there are more areas than there are objects. However, over two-thirds of the cobble tools show no evidence of manufacturing. They are, instead, handy objects that could be picked up and used without prior modification. The abrader, mortar, hopper mortar bases, utilized only cobbles, indeterminate cobble tools, almost all hammerstones, and most anvils, flakes/spalls, and millingstones from this site show use only and no manufacture. However, several anvils, flaked spalls, and millingstones, and a small percentage of hammerstones were modified by manufacture before being used.

The flake/spall objects from the site include several cleavers and a rather large subgroup of worn cobble flakes and/or spalls. The cleavers exhibit much flaked manufacture, while the flake/spall objects show little or no manfacture. They are objects that were probably used because their attributes served certain tasks without needing much modification before use.

The adze, choppers, mauls, net weight, and edge-ground cobbles, on the other hand, were usually modified into the desired shape before usage. It is

Table 3-26. Cobble tool type by type of manufacture[1], 45-OK-258.

Cobble Tool Type		Type of Manufacture							Total
		Flaked Surface	Flaked Edge Margin	Pecked Surface	Pecked Edge Margin	Pecked End	None	Indeterminate	
Abrader		–	–	–	–	–	1	–	1
Adze		–	–	–	–	–	–	1	1
Anvil		–	4	–	–	–	12	–	16
Chopper		–	16	–	1	–	10	1	28
Flake/Spall		1	7	–	–	–	14	–	22
Pestle		1	2	4	4	4	1	–	16
Maul		–	–	1	1	1	2	–	5
Millingstone		–	–	3	1	–	6	–	10
Mortar		–	–	–	–	–	1	–	1
Hopper Mortar Base		–	–	–	–	–	6	–	6
Net Weight		–	–	1	1	–	–	–	2
Peripherally Flaked Cobble		–	1	–	–	–	1	–	2
Tabular Knife		–	1	–	–	–	–	–	1
Hammerstone		–	–	–	2	1	89	–	92
Edge Ground Cobble		–	–	–	3	3	–	–	6
Utilized Only		–	–	–	–	–	2	–	2
Indeterminate		–	–	–	–	–	3	–	3
Total	N	2	31	9	13	9	148	2	214
	%	0.9	14.5	4.2	6.1	4.2	69.2	0.9	100.0

1. Each area of manufacturing on an object was coded seperately, therefore there are more areas of manufacture than objects.

interesting to note that over one-third of the choppers and one pestle needed no manufacture to be useable. Apparently, much of the chopping activities needed only a relatively sharp edge that could be found on cracked cobbles. The single pestle probably resulted from using an unmodified cobble that naturally approximated the shape of a pestle.

Both types of manufacture occur in approximately equal relative frequencies at the site. Of the cobble tool types modified heavily through manufacturing, choppers are predominantly flaked while pestles are mostly pecked. Anvils and flakes/spalls, when manufacture is present, are also flaked.

Table 3-27 shows the diagnostics of manufacture, that is, the kinds of areas on the object that have been modified through manufacture. Over one-third of these are unifacial edges. Approximately one-quarter each are bifacial edges and facets. The remaining diagnostics include beveled facets, flat surfaces, and a girdle. All of these indicate stages of manufacture by showing which part of a cobble had to be modified to obtain the desired shape.

The kinds and locations of wear on cobble tools are shown in Table 3-28. These data are presented here to show the kinds of wear and the location of wear areas in respect to manufacture.

Large rocks with manufacture and/or use attributes are classified as anvils, hopper mortar bases, millingstones, mortars, peripherally flaked cobbles, or indeterminate objects. The mortar is a basalt rock with a natural concavity due to thermal exfoliation. A red ochre stain is visible in the concavity. Wear was not identified, but may have been obscured by the ochre stain, which was not removed. Most of the milling stones exhibited ground, flat surfaces, and many milling stones show a broken or spalled base.

The most common type of large cobble tool is the anvil. The battering and crushing wear on these objects is not randomly distributed, but is restricted to definable areas on the objects. A majority of the anvils have a convex surface. Hopper mortar bases, on the other hand, exhibit well defined, circular wear areas on flat surfaces. Wear on these objects consists of both crushing and grinding.

Hammerstones, the largest group of cobble tools at the site, are mostly made of granite and many appear to be decomposing. Although specific wear patterns could be defined, the analyst had the impression that use was rather haphazard. Apparently, cobbles of convenient shape were picked up and used at the spur of the moment by the occupants of the site.

Many of the choppers also exhibit crude manufacture. Several of them have only a few flakes removed to form the chopping edge. Others are broken or spalled cobbles that were used as choppers without modification. Another characteristic of a number of choppers is evidence of crushing and/or chopping wear on the margin opposite from the flaked edge. Perhaps these served as hammerstones as well as choppers.

Three of the cobble tools from 45-OK-258 exhibit red ochre stains. They include the mortar described above (Zone 3, Area 5, Hudnut component), a pestle (Zone 5, Area 3, Hudnut component), and a millingstone (Zone 1, Area 2, Coyote Creek component). Their relatively dispersed horizontal and vertical

Table 3-27. Diagnostic of manufacture by cobble tool type, 45-OK-258.

Cobble Tool Type	Diagnostic of Manufacture								Total
	Unifacial Edge	Bifacial Edge	Facet	Bevelled Facet	Flat Surface	Girdle	None	Other	
Abrader	–	–	–	–	–	–	1	–	1
Adze	–	–	1	–	–	–	–	–	1
Anvil	4	–	–	–	–	–	12	–	16
Chopper	9	7	–	–	–	–	10	1	27
Flake/Spall	4	4	–	–	–	–	14	–	22
Pestle	1	1	4	–	–	–	1	–	7
Maul	–	–	1	–	–	–	2	–	3
Millingstone	–	–	–	–	3	–	6	–	9
Mortar	–	–	–	–	–	–	1	–	1
Hopper Mortar Base	–	–	–	–	–	–	6	–	6
Net Weight	–	–	–	–	–	1	–	–	1
Peripherally Flaked Cobble	–	1	–	–	–	–	1	–	2
Tabular Knife	1	–	–	–	–	–	–	–	1
Hammerstone	–	–	3	–	–	–	89	–	92
Edge Ground Cobble	–	–	3	2	–	–	–	–	5
Utilized Only	–	–	–	–	–	–	2	–	2
Indeterminate	–	–	–	–	–	–	3	–	3
Total	19	13	12	2	3	1	148	1	199

1. Each area of manufacturing on an object was coded separately, therefore there may be more diagnostics of manufacture than objects.

Table 3-28. Kind and location of wear on cobble tools, 45-OK-258.

Cobble Tool Type	Kind of Wear	Location of Wear with Respect to Manufacture	Number of Occurrences	Total
Abrader	Abrasion	Not applicable	1	1
Adze	None	Not applicable	1	1
Anvil	Battering	Distal edge	1	20
		Separate	1	
		Indeterminate	2	
	Crushing	Distal Edge	1	
		Separate	3	
		Indeterminate	9	
	Flaking	Indeterminate	1	
	Indeterminate	Indeterminate	1	
Chopper	Abrasion	Indeterminate	1	33
	Smoothing	Distal edge	1	
	Grinding	Distal edge	1	
	Battering	Lateral edge	1	
		Indeterminate	3	
	Crushing	Distal edge	9	
		Lateral edge	2	
		Indeterminate	5	
	Flaking	Indeterminate	2	
	Indeterminate	Indeterminate	1	
	None	Not applicable	7	
Flake/Spall	Polish	Indeterminate	1	37
	Smoothing	Distal edge	2	
		Separate	1	
		Indeterminate	3	
	Battering	Distal edge	1	
	Crushing	Distal edge	5	
		Separate	2	
		Indeterminate	10	
	Abrasion	Indeterminate	1	
	Flaking	Distal edge	2	
		Separate	1	
		Indeterminate	8	
Maul	Crushing	All facets	1	3
		Indeterminate	2	
Millingstone	Polish	Indeterminate	1	12
	Grinding	All facets	3	
		Indeterminate	5	
	Crushing	All facets	1	
		Indeterminate	1	
	Battering	All facets	1	

Table 3-28, cont'd.

Cobble Tool Type	Kind of Wear	Location of Wear with Respect to Manufacture	Number of Occurrences	Total
Pestle	Smoothing	Distal edge	1	22
		Lateral edge	1	
		Separate	1	
		All facets	2	
	Abrasion	Indeterminate	1	
	Grinding	Separate	1	
		All facets	4	
	Battering	Distal edge	1	
		Separate	1	
	Crushing	Distal edge	2	
		Lateral edge	1	
		Separate	2	
		All facets	4	
Mortar	Crushing	Indeterminate	1	1
Hopper Mortar Base	Crushing	Indeterminate	5	6
	Battering	Indeterminate	1	
Net Weight	None	Not applicable	1	1
Peripherally Flaked Cobble	None	Not applicable	2	2
Tabular Knife	Crushing	Distal edge	1	1
Hammerstone	Abrasion	Indeterminate	4	97
	Grinding	All facets	3	
		Indeterminate	1	
	Crushing	All facets	2	
		Indeterminate	66	
	Battering	Indeterminate	20	
	Flaking	Indeterminate	1	
Edge Ground Cobble	Grinding	All facets	3	6
	Crushing	All facets	3	
Utilized Only	Crushing	Not applicable	2	2
Indeterminate	Abrasion	Indeterminate	1	3
	Battering	Indeterminate	1	
	None	Indeterminate	1	

locations suggest that the three objects were used at different times and, therefore, represent three discrete activities.

The cobble tool assemblage at 45-OK-258 is not as large or as diverse as that recovered at 45-OK-11 (Lohse 1984f). There, the assemblage from the earlier Kartar phase is comparable to other cobble tool assemblages assigned to the Cascade Phase (cf. Leonhardy 1970; Leonhardy and Rice 1970; Bense 1972). The 45-OK-11 assemblage also contains cobble tools assigned to the Hudnut Phase, materials that should be comparable to the 45-OK-258 Hudnut component cobble tools. A comparison of the materials from the two sites, broken down by component would provide an overview of the use of cobble tools for three phases, covering 5,000 years of prehistory.

BONE ARTIFACTS

Of the 244 bone/antler artifacts recovered from 45-OK-258, 221 are unidentifiable flakes or fragments of cut or polished sections of long bone (Table 3-29). These fragments probably are remains of broken shaped objects or debitage from the manufacture of bone artifacts. Since no formed object occurred in anything even approaching high frequencies, I will not attempt a detailed discussion. There are some trends in comparing the assemblages from the Hudnut and Coyote Creek Phases. Only beads are present in both components. However, only three (33% of all beads) are from the Hudnut Phase, and their presence may be due to redeposition from the later phase. They are, after all, very small objects.

The single composite harpoon valve is from the Coyote Creek component, an awl, a billet, a pendant, a unifacially retouched object, and nine flaked long bones are restricted to the Hudnut component. Because of the small numbers of objects, these differences are mentioned here only because they may indicate trends in bone tool technology at the site.

Examples of bone tools are illustrated in Plates 3-6 and 3-7.

SUMMARY

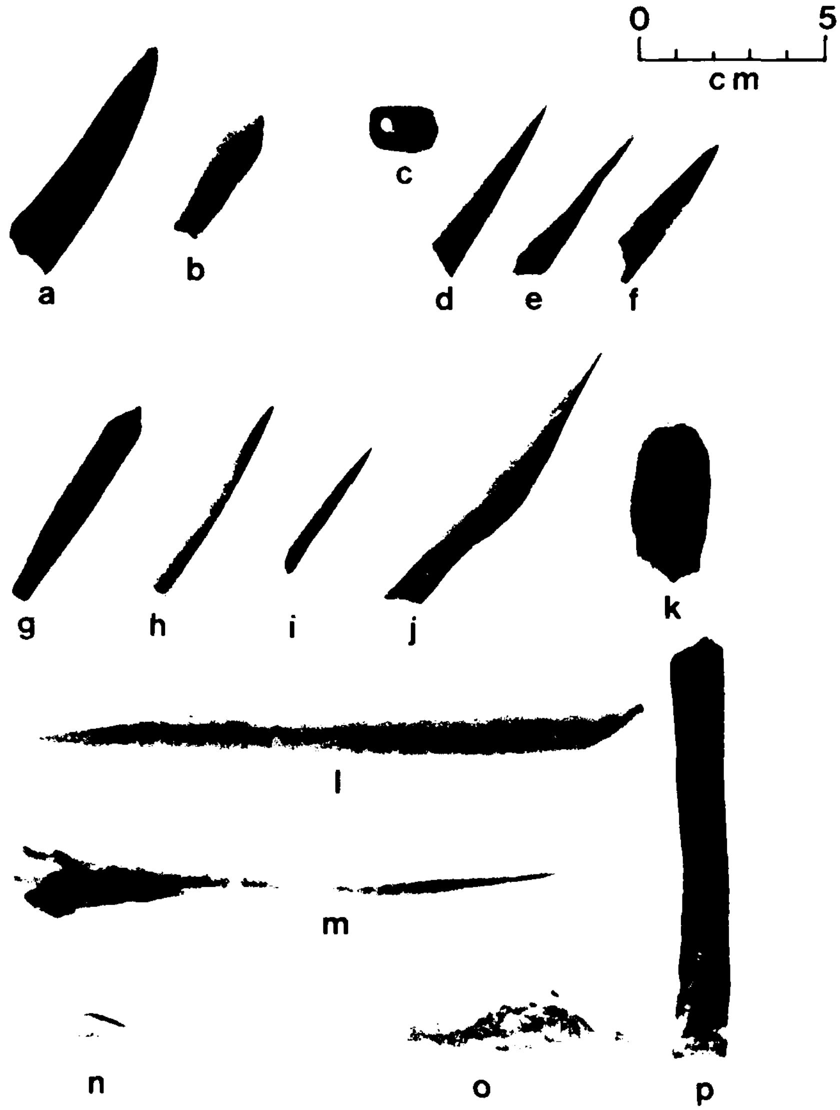
The above stylistic analysis is presented as a guide to the information available from 45-OK-258. There are problems with the interpretation of the stylistically analyzed assemblage that can be traced to the difficulty of interpreting the site's complex stratigraphy. Reasons for the problems are probably due to two main factors, including extreme disturbances of deposits by intense cultural activities and the realization that only a small part of the site remained to be excavated during the late 1970's and the early 1980's.

According to information gathered from local residents, the site was much more extensive before the original pool raise, in 1954, behind Chief Joseph Dam (Adeline and Larry Fredin, pers. comm.). The eroded portion of the site yielded a number of early historic artifacts, such as the remains of guns. Since the eroded site area was located downslope from the excavated site area, it may also have included a more observable separation between the Hudnut and Coyote Creek components since the cultural deposits there may have been

Table 3-29. Bone tools, 45-OK-258.

Zone/Component	Wedge	Composite Harpoon Valve	Point	Bead	Flaked	Pendant	Awl	Billet	Other	Total
1	–	1		2	–	–	–	–	10	13
2	–	–		4	–	–	–	–	71	75
Coyote Creek	–	1		6	–	–	–	–	81	88
3	–	–		2	3	1	–	–	46	52
4	–	–		1	4	–	1	–	44	50
5	–	–		–	2	–	–	1	38	41
6	–	–		–	–	–	–	–	1	1
Hudnut	–	–		3	9	1	1	1	129	144
Unassigned	1	–		–	–	–	–	–	11	12
Total	1	1		9	9	1	1	1	221	244

thicker and, therefore, less disturbed. Important chronological information and data pertaining to the early contact between Native Americans and Euroamerican cultures are thus irretrievably lost. Nevertheless, much information is available from this site, and this report provides a guide to the information.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KEY
Master Number:
Type:
Provenience:
Zone:
Material:

a. 966
Formed bone fragment
7N51W/Fe34/100
3
Antler

b. 1698
Point
0N41W/Fe81/80
2
Bone/antler

c. 644
Pendant
2S65W/Fe13/120
3
Bone

d. 189
Pointed bone fragment
4N68W/110
2
Bone

e. 651
Technologically modified bone
2S65W/Fe13/130
3
Bone

f. 353
Technologically modified bone
14N64W/80
3
Bone

g. 1423
Point
5N49W/Fe301/185
4
Bone/antler

h. 1821
Awl
1S39W/Fe501/235
5
Bone

i. 1517
Pointed bone fragment
5N45W/Fe16/200
4
Bone

j. 1471
Awl
5N48W/Fe300,301/170
4
Bone

k. 488
Wedge
7N70W/Fe7/150
4
Antler

l. 1763
Awl
0N39W/Fe501/185
5
Bone

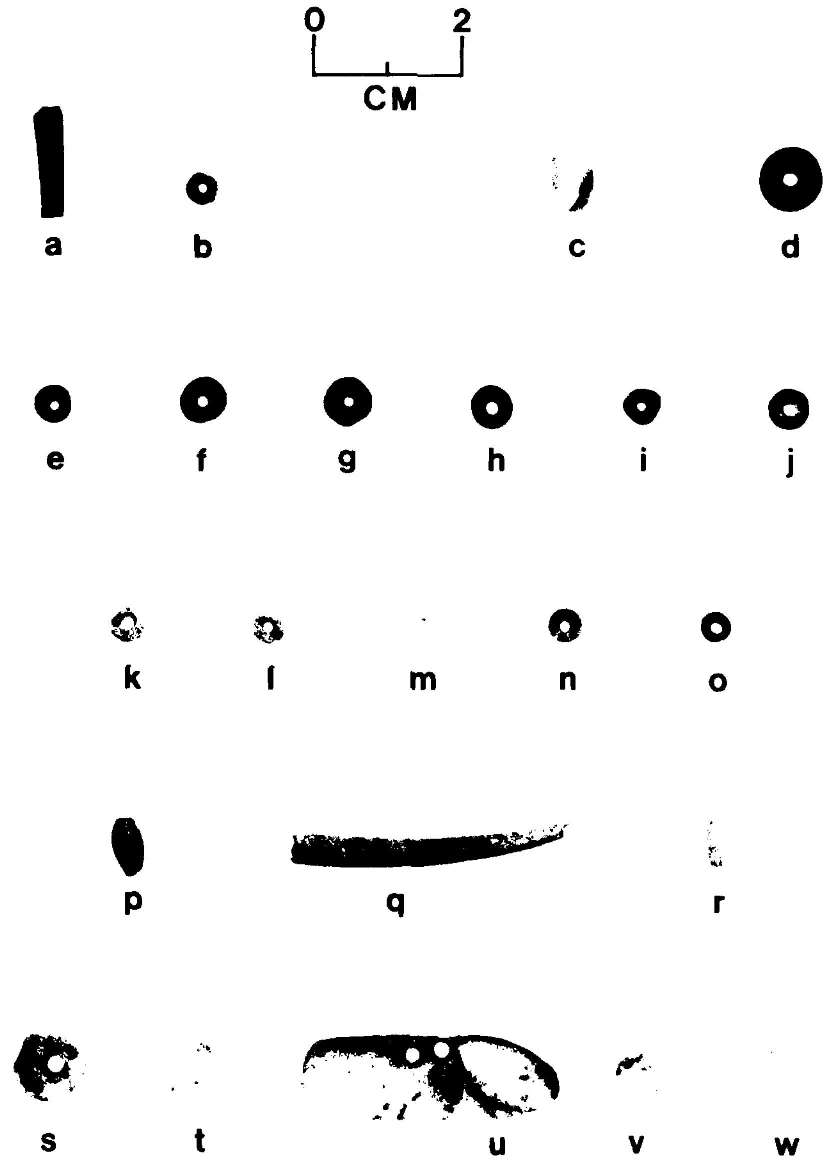
m. 976
Awl
7N51W/Fe301/210
4
Bone

n. 1823
Wedge
1S40W/Fe501/185
5
Antler

o. 1719
Wedge
0N41W/Fe107/210
5
Antler

p. 321
Formed object
1S44W
4
Bone

Plate 3-6. Examples of bone artifacts, 45-OK-258.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w

KEY
Master Number:
Type:
Provenience:
Zone:
Material:

a. 237 Bead 1N41W/90 2 Bone	b. 236 Bead 1N41W/90 2 Indeterminate	c. 1770 Bead 0N39W/Fe89/225 4 Olivella	d. 392 Bead 14N63W/90 4 Indeterminate		
e. 1898 Bead 1S36W/Fe501/200 5 Basalt	f. 1798 Bead 1S40W/Fe501/210 5 Indeterminate stone	g. 1846 Bead 1S38W/Fe501/210 5 Basalt	h. 2121 Bead 5S35W/Fe24/170 5 Fine-grained basalt	i. 1767 Bead 0N39W/Fe501/195 5 Basalt	j. 1940 Bead 3S39W/Fe501/200 5 Fine-grained basalt
k. 1943 Bead 3S39W/Fe501/215 5 Indeterminate	l. 1918 Bead 2S39W/Fe501/210 5 Indeterminate	m. 1854 Bead 0N37W/Fe500/140 4 Indeterminate	n. 1942 Bead 3S39W/Fe501/210 5 Indeterminate	o. 2105 Bead 4S35W/Fe204/160 4 Bone	
p. 1872 Bead 0N36W/Fe501/180 5 Olivella	q. 1895 Bead 1S36W/Fe501/185 5 Dentalium	r. 2051 Bead 2S34W/Fe100/155 9 Olivella			
s. 2625 Bead 2S35W/Fe501/185 5 Shell	t. 2021 Bead 2S35W/Fe500/155 5 Shell	u. 2622 Pendant 2S35W/Fe501/185 5 Shell	v. 2623 Bead 2S35W/Fe501/185 5 Shell	w. 2624 Bead 2S35W/Fe501/185 5 Shell	

Plate 3-7. Examples of beads and pendants, 45-OK-258.

4. FAUNAL ANALYSIS

Faunal remains from archaeological sites provide a source of data on the ecology and historic biogeography of animal species living in the site area, and on utilization of faunal resources by human occupants of the site. This chapter describes the faunal assemblage recovered from 45-OK-258, and summarizes the implications of the assemblage for understanding the archaeology of the site.

FAUNAL ASSEMBLAGE

The distribution of vertebrate and invertebrate faunal remains by component is summarized in Table 2-2. The vertebrate assemblage consists of 407,155 specimens weighing 130,068 g. Only 10,874 (approximately 3%) of the elements were identifiable. Of the 10,874 identified elements, 10,452 (96%) are mammalian, 164 (2%) are reptilian, 120 (1%) are amphibian and 138 (1%) are fish. Taxonomic composition and distribution of the vertebrate remains for the site as a whole and by component are shown in Table 4-1. The invertebrate assemblage consists of 62,148 shell fragments weighing 143,810 g. The shells have not been analyzed.

The following summary presents criteria used to identify elements where appropriate, and comments concerning the past and present distribution and cultural significance of the taxa represented. A summary of the elements representing each taxon is provided in Appendix C. The assemblage is dominated by extremely fragmented artiodactyl elements as would be expected if the bones were crushed for marrow extraction (Leechman 1951). Most of the unidentified bone appears to be fragments of artiodactyl long bones resulting from bone crushing and from natural deterioration.

SPECIES LIST

MAMMALS (NISP=10,452)

Lepus cf. *townsendii* (white-tailed hare) -- 2 elements.

Two species of *Lepus* presently inhabit the project area, *L. townsendii* (white-tailed hare) and *L. californicus* (black-tailed hare). A third species, *L. americanus* (snowshoe hare), inhabits regions adjacent to the project area. These elements could not be assigned to species on the basis of morphological features. *L. californicus* is thought to have

Table 4-1. Taxonomic composition and distribution of vertebrate remains from 45-OK-258.

Taxa	Coyote Creek Component		Hudnut Component		Unassigned	Site Total	
	NISP	MNI	NISP	MNI	NISP	NISP[1]	MNI[2]
MAMMALIA (NISP=10,452)							
Leoporidae							
Lepus cf. townsendii	–	–	2	1	–	2	1
Sylvilagus nuttallii	–	–	–	–	1	1	1
Sciuridae							
Marmota flaviventris	10	1	7	1	1	18	1
Spermophilus spp.	–	–	2	1	–	2	1
Geomyidae							
Thomomys talpoides	31	6	107	14	44	182	15
Heteromyidae							
Perognathus parvus	29	5	90	14	12	131	23
Castoridae							
Castor canadensis	1	1	3	1	–	4	1
Cricetidae	6	–	5	–	1	12	–
Peromyscus maniculatus	5	3	24	9	3	32	12
Microtus spp.	3	1	6	2	2	11	5
Lagurus curtatus	3	2	1	1	–	4	2
Erethizontidae							
Erethizon dorsatum	1	1	–	–	–	1	1
Canidae	4	–	34	–		38	–
Canis spp.	24	–	31	–	–	55	–
C. latrans	1	1	1	1	–	2	1
C. lupus	–	–	1	1	–	1	1
C. familiaris	–	–	110	1	–	110	1
Vulpes vulpes	–	–	5	1	–	5	1
Ursidae							
Ursus spp.	2	1	2	1	–	4	1
Mustelidae							
Martes americana	–	–	5	2	–	5	2
M. pennanti	4	1	3	1	–	7	1
Mustela frenata	–	–	1	1	–	1	1
Taxidea taxus	–	–	1	1	–	1	1
Equidae							
Equus caballus	19	1	–	–	–	19	1
Cervidae	4	–	53	–	3	60	–
Cervus elaphus	4	1	10	1		14	1
Odocoileus sp.	1,496	12	1,844	26	112	3,452	–
Antilocapridae							
Antilocapra americana	28	1	11	1	3	42	2
Bovidae	98	–	83	–	4	185	–
Ovis canadensis	344	8	165	3	2	511	10
Deer-Sized	2,636	–	2,790	–	89	5,515	–
Elk-Sized	8	–	8	–	–	16	–

Table 4-1. Cont'd.

Taxa	Coyote Creek Component		Hudnut Component		Unassigned	Site Total	
	NISP	MNI	NISP	MNI	NISP	NISP[1]	MNI[2]
REPTILIA (NISP=164)							
Chelydridae							
<u>Chrysemys picta</u>	18	-	56	-	5	79	-
Colubridae	10	-	70	-	5	85	-
AMPHIBIA (NISP=120)							
Ranidae/Bufonidae	-	-	44	6	1	45	6
Ambystomatidae	35	-	40	-	-	75	-
PISCES (NISP=138)							
Salmonidae	20	-	65	-	9	94	-
Cyprinidae	7	-	33	-	4	44	-
TOTAL	4,851		5,713		301	10,865	

[1] NISP = Number of Identified Specimens.
[2] MNI = Minimum Number of Individuals.

immigrated from the Great Basin during the early part of the twentieth century (Couch 1927; Dalquest 1948). <u>L. americanus</u> is largely nocturnal and secretive, and inhabits wooded areas. Consequently, these specimens have been tentatively assigned to <u>L.</u> cf. <u>townsendii</u>.

<u>Sylvilagus</u> cf. <u>nuttallii</u> (Nuttall cottontail) -- 1 element.

Three species of rabbits may be present in the site area. <u>Sylvilagus nuttallii</u> and <u>S. idahoensis</u> are both native to eastern Washington, <u>S. floridanus</u> was introduced in the early 20th century (Dalquest 1941). Of the two native species <u>S. nuttallii</u> is larger and more abundant. This specimen was identified as <u>S. nuttallii</u> because of its size. <u>S. nuttallii</u> is a common resident of rocky, sagebrush habitats in the project area. Both rabbits and hares were sought by ethnographic tribes (Post 1938:24) for furs and food (Ray 1932:87).

<u>Marmota flaviventris</u> (yellow-bellied marmot) -- 18 elements.

All marmot remains have been tentatively assigned to the species <u>M. flaviventris</u> on the basis of present distribution. This species is the only marmot now living in the project area, and is a common resident of talus slopes. Marmots were exploited as a small game resource by ethnographic inhabitants of eastern Washington (Ray 1932; Post 1938).

Their presence in this faunal assemblage may indicate prehistoric exploitation.

Spermophilus spp. (ground squirrels) -- 2 elements.

Three species of ground squirrels are currently found in eastern Washington: _Spermophilus columbianus_, _S. washingtoni_, and _S. townsendii_. _S. columbianus_ is larger than the other two and prefers more mesic habitats. _S. washingtoni_ and _S. townsendii_ are smaller and prefer sagebrush and grass zones to the south and east of the project area (Dalquest 1948:268; Ingles 1965:169). These elements could not be assigned to species. Ground squirrels have been reported as a food resource in the ethnographic literature (Ray 1932:82).

Thomomys talpoides (northern pocket gopher) -- 182 elements.

Thomomys talpoides is the only geomyid rodent in the project area. Because pocket gophers are extremely fossorial and there is very little evidence that they were utilized prehistorically or ethnographically, their presence in this assemblage may be considered fortuitous.

Perognathus parvus (Great Basin pocket mouse) -- 131 elements.

Perognathus parvus is the only heteromyid rodent known in the project area. Like the pocket gophers, _P. parvus_ is most likely present as a result of natural agents of deposition.

Castor canadensis (beaver) -- 4 elements.

Beaver is a native inhabitant of a wide variety of riverine habitats in Washington (Dalquest 1948). There is ethnographic evidence that beaver were exploited (Post 1938), presumably for their pelts and as a food resouce, although neither is explicitly stated. Beaver teeth are known to have been used by the Coeur d'Alene to incise wood, bone, antler, and soft stone (Teit 1930).

Peromyscus maniculatus (deer mouse) -- 32 elements.

Deer mice are residents of all habitat types in the project area. There is no evidence that deer mice were ever utilized.

Microtus spp. (meadow mouse) -- 11 elements.

Three species of _Microtus_ occur in the site area: _M. montanus_, _M. pennsylvanicus_ and _M. longicaudus_. All three species inhabit marshy areas or live near streams. _M. montanus_ can also be found in more xeric areas. None of the elements in this assemblage could be assigned

to species. There is no evidence that microtine mice were culturally deposited.

<u>Lagurus curtatus</u> (sagebrush vole) -- 4 elements.

Sagebrush voles inhabit dry sagebrush areas with little grass (Maser and Storm 1970:142). Only cranial material of this species is distinguishable from <u>Microtus</u> sp. The occlusal surface of M^3 (Maser and Storm 1970) and the location of the mandibular foramen (Grayson 1984) are distinctive.

<u>Erethizon dorsatum</u> (porcupine) -- 1 elements.

Porcupines are largely arboreal and prefer areas of coniferous trees. They are common in wooded areas near the site. Although they were not a popular food item among the ethnographically known people, there was no taboo against eating porcupines (Ray 1932:90). Embroidery of porcupine quills was used to decorate garments (Post and Commons 1938:45; Ray 1932:50).

<u>Canis latrans</u>, <u>C. lupus</u>, <u>C. familiaris</u>, <u>Vulpes vulpes</u> -- 211 elements.

Both <u>Canis latrans</u> (coyote) and <u>C. familiaris</u> (domestic dog) are common in the project area today. <u>C. latrans</u> is an indigenous species, and <u>C. familiaris</u> has great antiquity in the northwest (Lawrence 1968). <u>C. lupus</u> (wolf) is also known to have been a local resident in the past, but has been locally extinct since about 1920 (Ingles 1965). Dogs were used ethnographically for hunting deer, but were not eaten except in emergencies (Post 1938). Coyotes, however, were considered good food (Ray 1932:90). The elements assigned to the species <u>C. lupus</u> and <u>V. vulpes</u> were identified on the basis of size. <u>C. familiaris</u> was recognized by crowding and morphology of the dentition (Krantz 1959). The 110 elements of <u>C. familiaris</u> in Zone 1 represent a single articulated animal that appears to have been deliberately buried.

<u>Ursus</u> spp. (grizzly bear and black bear) -- 4 elements.

Both species of bear are native to Washington state. Black bear occurs in greatest abundance in the forested uplands (Dalquest 1948:172), but is known to frequent the banks of the Columbia River during berry season (Ray 1932:82). Grizzly bears are now extinct throughout Washington state, and apparently never enjoyed as wide a distribution as the black bear (Dalquest 1948). There are ethnographic records for hunting of both species (Ray 1932; Post 1938).

Martes americana (marten)-- 5 elements.

The western marten is arboreal and has not been recorded as a resident of the project area. There are ethnographic reports that martens were trapped in the adjacent uplands (Ray 1932:85).

Martes pennanti (fisher) -- 7 elements.

Fishers occupy upland habitats somewhat lower than martens and wolverines (Dalquest 1948:188; Ingles 1965:371). Fishers and martens are never abundant in any fauna; they are solitary animals and require large territories. Their habitat preferences reduce their chances of becoming part of a natural paleontological or archaelolgical assemblage (Anderson 1970:4). Fishers, like martens, were sought by ethnographic people (Ray 1932:85). Although some of the seven elements are assigned to each component, they appear to represent a single individual. Mixing of deposits or poor separation of cultural features in assigning zones is indicated. Cut marks on the femur indicate the animal was butchered.

Mustela frenata (long-tailed weasel) -- 1 element.

Long-tailed weasels are ubiquitous in Washington, and hunt small rodents by following them into their burrows. There is reference to long-tailed weasels in the ethnographic literature (Ray 1932: 49, 50).

Taxidea taxus (badger) -- 1 element.

The badger is a powerful burrower and is found thoughout eastern Washington, though not in large numbers (Ingles 1965). Badgers were trapped regularly by the Sanpoil and Nespelem (Ray 1932:85).

Equus caballus (horse) -- 19 elements.

Horses apparently spread onto the Columbia Plateau from the Shoshone of southern Idaho during the early 18th century (Wissler 1914; Haines 1938). Although there is no indication that horses were eaten, they were used for hunting, transportation and trade (Anastasio 1972:127-130).

Cervus elaphus (elk) -- 14 elements.

Elk are rare in the extant local fauna of the project area. The closest population is in the Cascade Mountains to the west (Ingles 1965). Elk bones occur in low frequencies in many archaeological sites in eastern Washington, however, indicating that elk once occupied a more extensive range than at present and/or that people were traveling some distance to hunt them.

Ododoileus spp. -- 3,452 elements.

Two species of deer may be represented in this assemblage, Odocoileus hemionus and O. virginianus. Deer are thought to have represented a major food resource to the prehistoric inhabitants of eastern Washington (Gustafson 1972), as they did for the ethnographic cultures (Post 1938; Ray 1932).

Antilocapra americana (pronghorn antelope) -- 42 elements.

Although antelope are only present today in Washington as an introduced species (Ingles 1965), antelope remains are common in both historic and prehistoric archaeological sites, especially in the arid part of the Columbia Basin (Gustafson 1972; Osborne 1953). There are ethnographic records of hunting practices associated with antelope procurement (Ray 1932; Post 1938).

Ovis canadensis (mountain sheep) -- 511 elements.

Mountain sheep occur in archaeological sites in eastern Washington with some regularity. The presence of this species is somewhat difficult to interpret, however, because references to it in the ethnographic literature are scarce. Moreover, when competition with man and domestic stock for range became severe during historic times, the habitat preference of this species appears to have changed (Manville 1980). Mountain sheep are known ethnographically to have been exploited both for meat and as a source of bone for tools (Spinden 1908).

REPTILIA (NISP=164)

Chrysemys picta (painted turtle) -- 79 elements.

Painted turtle is the only native turtle currently living in the project area. Clemmys marmorata (western pond turtle) has been reported in the eastern part of Washington in the ethnographic literature (Ray 1932:87), but this would represent a major extension of the known range of C. marmorata. At the present time, C. marmorata only occur on the west side of the Cascades and in the southern part of the state. Because there is no way of verifying that any other turtle has ever lived in the project area, and no indication that they were imported, all turtle remains have been assigned to C. picta in the mammals above. Turtles were regularly taken by ethnographically known people as a food source (Ray 1932:87). The incidence of burned turtle elements indicates they were utilized at this site.

Colubridae (Colubrid snakes) -- 85 elements.

Snake vertebrae were identified to family on the basis of size. There are at least four species of snakes living in the project area that may be represented by these vertebrae: *Coluber constrictor* (western yellow-bellied racer), *Pituopis melanoleucus* (gopher snake), *Thamnophis sirtalis* (valley garter snake), and *T. elegans* (wandering garter snake). Most snake elements appear to be intrusive.

AMPHIBIANS (NISP=120)

Ranidae/Bufonidae (frogs and toads) -- 45 elements.

Both frogs and toads inhabit the project area (Stebbins 1966). Inadequate comparative material precluded assigning these elements to the correct family. Like the snakes, these elements appear to be intrusive.

Ambystoma spp. (salamander) -- 75 elements.

Two species of salamanders now live in the project area: long-toed salamanders (*Ambystoma macrodactylum*) and tiger salamanders (*A. tigrinum*). These elements could not be identified to the species level. There is no evidence that salamanders were ever eaten.

PISCES (NISP=138)

Salmonidae (salmon, trout, and whitefish) -- 94 elements.

These vertebrae could belong to any of at least eight species of salmonid fish known in the project area. All fish vertebrae with parallel-sided fenestrated centra were assigned to this family. Salmonid fish represented a major food resource for ethnographic tribes (Ray 1932; Post 1938; Craig and Hacker 1940). The high incidence of burned and broken vertebrae in this assemblage indicates salmonid fish were utilized at this site.

Cyprinidae (carp and minnows) -- 44 elements.

Inadequate comparative collections precluded more specific identification of fish vertebrae. Assignment of nonsalmonid fish vertebrae to family was made on the basis of size. At least seven species of cyprinid fish occur in the project area. Some ethnographic groups exploited these fish (Post 1938). These fish remains are probably present as a result of human activity.

DISCUSSION

SUBSISTENCE

The faunal assemblage includes taxa that were deposited by both cultural and natural agents. Marks such as striae left by cutting skin and meat from the bones and flaking as the result of deliberate breakage of bone in the butchering process are used here as evidence of cultural agents of deposition. Butchering marks are tabulated for this assemblage in Table 4-2. Burned bones, also indicators that cultural activities operated in the depositional process, are tabulated in Table 4-2 as well. Bones bearing butchering marks and burned bones occur most frequently among the artiodactyls.

Artiodactyls, the primary subsistence resource represented in the faunal assemblage, constitute over 90% of the total identified elements. Deer (Odocoileus spp.) are the most abundant artiodactyl but elk (Cervus elaphus), antelope (Antilocapra americana), and sheep (Ovis canadensis) are also present. These taxa undoubtedly represented the major mammalian food resources for both the Hudnut and Coyote Creek components.

The highly fragmented nature of the artiodactyl assemblage suggests intensive use of the large mammals. When deer-sized and elk-sized elements are considered as well as those identified to species, all parts of the skeleton are represented. Allowing for differences in bone densities and probabilities of preservation, the data in Tables 2 and 3, Appendix C suggest that all parts of the skeletons of the small artiodactyls were brought back to the site, and all were used.

The equid elements (Equus caballus) in the Coyote Creek component represent a single horse. There is no morphological evidence indicating that this animal was butchered. Further, the ethnographic literature gives no indication that horses were considered a desirable food resource, but were used in hunting, transportation and trade (Anastasio 1972:127-130). Horses apparently spread onto the Columbia Plateau from southern Idaho during the early 18th century (Wissler 1914:24; Haines 1938:435-436). The impact of the introduction of horses on Plateau cultures is still a subject of controversy (Anastasio 1972; Ray 1932; Grabert 1970; Milrendorf et al. 1981; Schalk 1982).

Dog (Canis familiaris), the only other domestic species in this assemblage, occurs in the Hudnut Phase component. The large number of elements represent a single individual. This individual shows no evidence of having been butchered and was apparently deliberately buried. The practice of keeping domestic dogs has a long history in North America (Lawrence 1967, 1968). Dogs were generally not eaten by the ethnographically known tribes, but were used in hunting and kept as pets (Spinden 1908:207; Ray 1932:90; Post 1938:34; Turney-High 1937:104).

Other canids represented in this assemblage include coyote (Canis latrans), wolf (C. lupus) and red fox (Vulpes vulpes). All three species were hunted or trapped by ethnographic tribes. Coyotes were considered good food (Ray [illegible]) and foxes were kept as pets (Post 1938:34). The burned canid

Table 4-2. Distribution of butchering marks and burning by element and zone, 45-OK-258.

Element	Coyote Creek Component					Hudnut Component					Unassigned		
	B[1]	1	2	3	5	B	1	2	3	5	B	2	5
Martes pennanti													
femur proximal	–	1	–	–	–	–	–	–	–	–	–	–	–
Cervidae													
antler	–	–	–	–	–	1	–	–	–	5	–	–	1
***Odocoileus* spp.**													
skull	–	6	1	–	–	–	3	–	–	–	–	–	–
mandible	1	6	1				12	7					
scapula	–	2	–	1	–	–	3	–	–	–	–	–	–
humerus distal	–	1	3	–	–	–	–	3	–	–	–	–	–
radius proximal	–	–	–	–	–	–	–	1	–	–	–	–	–
metacarpal proximal	–	–	–	–	–	–	–	2	–	–	–	–	–
metacarpal distal	–	1	–	–	–	–	–	–	–	–	–	–	–
innominate	–	–	–	1	–	–	–	–	–	–	–	–	–
tibia proximal	1	–	–	–	–	–	–	–	–	–	–	–	–
astragalus	1	–	–	–	–	–	–	–	–	–	–	–	–
metatarsal proximal	–	–	5	–	–	–	–	–	–	–	–	–	–
metatarsal shaft	–	–	1	–	–	–	–	–	–	–	–	–	–
metatarsal distal	–	–	–	–	–	–	–	1	–	3	–	–	–
dew claw	1	–	–	–	–	–	–	–	–	–	–	–	–
second phalanx	–	–	2	–	–	–	–	–	–	–	–	–	–
third phalanx	–	–	–	–	–	1	–	–	–	–	–	–	–
tooth	2	–	–	–	–	3	–	–	–	–	–	–	–
Ovis canadensis													
skull	–	1	–	–	–	–	–	–	–	–	–	–	–
mandible	–	1	1	–	–	–	2	–	–	–	–	–	–
humerus distal	–	–	–	1	–	–	–	–	–	–	–	–	–
radius distal	–	–	–	1	–	–	–	–	–	–	–	–	–
innominate	–	–	–	–	–	–	1	–	–	–	–	–	–
tibia distal	–	–	1	–	–	–	–	–	–	–	–	–	–
metatarsal proximal	–	1	1	–	–	–	–	1	–	–	–	–	–
metatarsal distal	–	–	1	–	–	–	–	–	–	–	–	–	–
third phalanx	–	–	1	–	–	–	–	–	–	–	–	–	–
metapodial distal	–	–	1	1	–	–	–	1	1	–	–	–	–
Antilocapra americana													
metatarsal distal	–	–	1	–	–	–	–	–	–	–	–	–	–
Deer-Sized													
skull	2	–	–	–	–	3	–	–	–	–	1	–	–
mandible	1	5	6	–	–	1	–	–	–	–	–	–	–
atlas	–	1	–	–	–	–	–	–	–	–	–	–	–
axis	–	1	–	–	–	–	–	–	–	–	–	–	–
cervical vertebra	1	–	–	–	–	1	–	–	–	–	–	–	–
thoracic vertebra	–	1	–	–	–	1	–	–	–	–	–	–	–
lumbar vertebra	4	–	–	–	–	3	–	–	–	–	–	–	–
rib	5	8	–	–	–	14	–	–	–	–	–	–	–

Table 4-2. Cont'd.

Element	Coyote Creek Component					Hudnut Component					Unassigned		
	B	1	2	3	5	B	1	2	3	5	B	2	5
Deer-Sized (continued)													
scapula	1	3	-	-	-	-	-	-	-	-	-	-	-
humerus shaft	3	-	53	-	-	2	-	-	-	-	-	-	-
radius shaft	1	-	54	-	-	-	-	-	-	-	-	-	-
ulna proximal	1	-	-	-	-	-	-	-	-	-	1	-	-
ulna shaft	1	1	2	-	-	-	-	-	-	-	-	-	-
carpals	2	-	-	-	-	-	-	-	-	-	-	-	-
metacarpal shaft	2	-	38	-	-	-	-	-	-	-	-	1	-
innominate	-	-	2	-	-	-	-	-	-	-	-	-	-
femur proximal	1	-	-	-	-	-	-	-	-	-	1	-	-
femur shaft	-	1	80	-	1	3	-	-	-	-	-	-	-
tibia shaft	2	4	91	-	1	1	-	-	-	-	1	-	-
astragalus	4	-	-	-	-	2	-	-	-	-	1	-	-
calcaneus	-	-	-	-	-	1	-	-	-	-	-	-	-
tarsals	-	2	-	-	-	1	-	-	-	-	-	-	-
metatarsal shaft	6	4	67	-	3	8	-	-	-	-	2	-	-
metatarsal distal	-	1	-	-	-	-	-	-	-	-	-	-	-
dewclaw	4	-	-	-	-	1	-	-	-	-	-	-	-
first phalanx	9	-	-	-	-	1	-	-	-	-	-	-	-
second phalanx	2	-	-	-	-	-	-	-	-	-	-	-	-
metapodial proximal	-	-	-	-	-	-	-	-	-	-	-	-	-
metapodial shaft	-	3	66	1	3	-	-	2	-	-	-	1	-
hyoid	1	3	-	-	-	-	-	-	-	-	-	-	-
metapodial	13	-	-	-	-	6	-	-	-	-	1	-	-
sesamoid	5	-	-	-	-	4	-	-	-	-	-	-	-
Elk-Sized													
lumbar vertebra	-	-	-	-	-	-	1	-	-	-	-	-	-
radius shaft	-	-	1	-	-	-	1	-	-	-	-	-	-
metatarsal shaft	-	-	1	-	-	-	-	-	-	-	-	-	-
metapodial shaft	-	-	2	-	-	-	-	-	-	-	-	-	-
Marmota flaviventris													
humerus shaft	1	-	-	-	-	-	-	-	-	-	-	-	-
Canidae													
calcaneus	-	-	-	-	-	1	-	-	-	-	-	-	-
first phalanx	1	-	-	-	-	-	-	-	-	-	-	-	-
third phalanx	1	-	-	-	-	-	-	-	-	-	-	-	-
metapodial	-	-	-	-	-	1	-	-	-	-	-	-	-
Chrysemys picta													
shell	1	-	-	-	-	3	-	-	-	-	-	-	-
Salmonidae													
vertebra	3	-	-	-	-	-	-	-	-	-	-	-	-
Cyprinidae													
vertebra	1	-	-	-	-	-	-	-	-	-	-	-	-

1B=burned, 1=striae, 2=flake, 3=chopping scar, 5=artifact

elements in both components may indicate that at least one of these species was exploited for economic purposes.

Four mustelids occur in this assemblage: marten (Martes americana), fisher (M. pennanti), weasel (Mustela frenata), and badger (Taxidea taxus). All four were trapped for their furs by ethnographically known peoples (Ray 1932:85). Of all the mustelid remains in this assemblage only a single element, the femur of a fisher, shows evidence of butchering. Marten and fisher do not occur in the site area today, but prefer higher elevation habitats with more trees. Despite the scanty evidence that these two species were used by people they are probably present in this assemblage because of cultural activities. The alternative explanation for the occurrence of two upland mustelids is the presence in the site area of an environment which would have provided them with suitable habitat. There is no other indication of a more boreal environment in the site area at the time of deposition. Consequently, it is suggested that people were hunting/trapping in the uplands.

Weasels and badgers are ubiquitous in the site area, and their burrowing behavior makes it possible that they are intrusive. It is not possible to distinguish between natural and cultural agents of deposition for these taxa.

The occurrence of an array of carnivores (canids, ursids, and mustelids) that are generally rare in any faunal assemblage, as well as the presence of beaver and hare, suggest processing of hides. The ethnographic literature indicates some carnivores, especially bear and coyote, were also used as a food resource (Ray 1932; Post 1938). There is, however, no way to distinguish taxa exploited for hides from those exploited for food in this assemblage.

There are several small mammals that may be represented as the result of use for food and furs. Hares (Lepus cf. townsendii), rabbits (Sylvilagus nuttallii), marmots (Marmota flaviventris), ground squirrels (Spermophilus spp.), and porcupines (Erethizon dorsatum) are recorded in the ethnographic literature as food resources (Post 1938; Ray 1932). These taxa may occur in this assemblage as the result of similar use prehistorically.

Stahl (1982) has recently demonstrated that small mammals such as gophers and mice offer a high meat yield per live weight and that they are relatively abundant in environments associated with human activity. He argued that many small mammals may well have been a rich food resource in prehistoric subsistence systems. The possibility that mice and gophers were utilized at 45-OK-258 cannot be discounted, but there is no evidence of burned or butchered rodent remains that would support such a suggestion. Because many species of rodents are abundant in the site area and burrow extensively, it is likely that most occur in this assemblage as a result of natural deposition.

Turtle shell fragments occur in both components. Ethnographic analogy (Ray 1932:82) and the occurrence of burned shell fragments suggest that turtles were sought as a food resource. There is, however, no evidence that the other reptiles or amphibians in this assemblage represent species of economic importance.

Both salmonid and cyprinid fish occur in surprisingly low frequencies. Fish undoubtedly represented a food resource for site occupants as they did for ethnographic people (Ray 1932; Post 1938; Craig and Hacker 1940). The low frequency of fish remains in these assemblages could be due to seasonal occupation of the site, anomalous preservation of fish remains, a sampling bias, or fish processing practices that entailed disposal of osseous fish remains away from the site area.

SEASONALITY

Two kinds of data that indicate season of site occupation were recovered from the faunal assemblage. The first is age at death of taxa with a known season of birth. The ages at death for 33 deer have been estimated by reference to criteria described by Robinette et al. (1957) and Severinghaus (1949). Ages at death for five sheep were estimated by reference to criteria described by Deming (1952). Age at death for these antiodactyls is useful in determining season of death because we know deer and sheep generally give birth in May or June (Ingles 1965). The second source of seasonal data is the presence of seasonally active taxa. Elements from two such taxa--marmots (Marmota flaviventris) and painted turtles (Chrysemys picta)--are present in both zones. Marmots enter estivation in June and go into hibernation in August or September. They emerge in March (Ingles 1965; Dalquest 1948). Painted turtles hibernate from late October until March or April (Stebbins 1966; Ernst and Barbour 1972).

The seasons of site occupation indicated by each of the seasonally sensitive taxa are summarized in Table 4-3. The range of months indicated by deer and sheep has been extended because the wear pattern from which age is assessed is highly variable. Not only does dental wear depend on location of the population and forage type, but variation increases with age of the animal.

Seasonally sensitive taxa from the Coyote Creek component indicate the site was occupied at least from May or June through November or December. Hudnut component taxa indicate that the site was occupied during all seasons of the year, but sheep and deer were hunted most frequently in the fall and winter.

SUMMARY

The vertebrate fauna from 45-OK-258 is representative of the fauna expected in the project area. Antelope is the only species represented in this assemblage that does not occur in or near the site area today. Antelope became locally extinct in late prehistoric or historic times (Dalquest 1948; Taylor and Shaw 1929), and are not unusual occurrences in archaeological sites in eastern Washington. Elk (Cervus elaphus), sheep (Ovis canadensis), wolf (Canis lupus), and fisher (Martes pennanti) and marten (M. americana) are uncommon or absent from the project area at present, but may be occasional visitors from the north. The remaining taxa either occur in the

Table 4-3. Distribution of seasonal indicators, 45-OK-258.

Component	Taxon	Season of Death[1]: Jan Feb Mar Apr May Jun Jul Aug Sept Oct Nov Dec
Coyote Creek	<u>Marmota flaviventris</u> (NISP=10)	NISP[2]=10
	<u>Chrysemys picta</u> (NISP=18)	NISP=18
	<u>Ovis canadensis</u> 36 months	
	25 months	
	39 months	
	42 months	
	<u>Odocoileus</u> spp. 4 months	
	78 months	
Hudnut	<u>Marmota flaviventris</u> (NISP=7)	NISP=7
	<u>Chrysemys picta</u> (NISP=56)	NISP=56
	<u>Ovis canadensis</u> 39 months	
	<u>Odocoileus</u> spp. 8 months	
	68 months	
	80 months	
	140 months	
	8 months	
	10 months	
	10 months	
	60 months	
	120 months	
	18 months	
	18 months	
	30 months	

Table 4-3. Cont'd.

Component	Taxon		Season of Death											
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Hudnut	Odocoileus spp. (continued)	30 months												
		42 months												
		66 months												
		66 months												
		90 months												
		7 months												
		7 months												
		7 months												
		19 months												
		48 months												
		110 months												
		15 months												
		16 months												
		28 months												
		5 months												
		17 months												
		65 months												
		6 months												
		6 months												

[1] Because reliability of age estimates for artiodactyls decreases with increasing age, we have used a two month span for individuals ≤24 months, a four month span for individuals >24 months and a five month span for individuals ≥100 months.
[2] Number of Identified Specimens.

site area or there is reason to believe they were introduced into the assemblage from nearby areas by cultural activities associated with the procurement of food and hides. With the exception of the horse, dog, mouse, gopher, snake and amphibian elements, this assemblage represents an accumulation of refuse from economic activities. There is no reason to suggest that horses or dogs represent a food resource, but these domestic animals may have been instrumental in the subsistence quest. The small rodents, snakes and amphibians are most likely present in this assemblage as a result of natural deposition. The turtles and both families of fish were undoubtedly used by site residents, but their low frequencies in this assemblage may indicate each represented only a minor resource.

5. BOTANICAL ANALYSIS

Botanical studies, sometimes termed paleoethnobotany, deal with the analysis of vegetable materials found in archaeological matrices (Dimbleby 1967; Renfrew 1973; Dennel 1976; Ford 1979). These materials provide valuable information concerning the resource base of peoples who inhabited a site. With lithic and faunal materials, they give us the means for making inferences about the peoples' patterns of subsistence, as well as interpreting site features. The presence and condition of specific kinds of fruits, seeds, and flower parts, for instance, can suggest seasonality of site use.

At 45-OK-258, 51 flotation samples (flotation samples) were taken from over 56 kg of sediment. One carbon sample collected for radiocarbon dating and one sample extracted from unit level bags also were examined.

Flotation samples were taken from each unit level in two units (0N46W and 3N64W) excavated during testing. The first unit is on the southern edge of Housepit 3. Located about 1.5 m north of Housepit 4, the second unit contains a dated feature (Testing Feature A). Flotation samples from features came from various locations within Housepits 2, 3 and 5. The flotation sample from 0N46W and 3N64W were usually under 100 g while the samples from features averaged about 1800 g of sediment. Nearly all the testing phase flotation samples and one-quarter of the feature flotation samples were subjected to sugar flotation. The remainder were subjected to water separation. Flotation procedures are described in more detail in the project's research design (Campbell 1984d). We drew our standard subsamples from the sugar or water light fractions for detailed analysis, and scanned all fractions to be sure nothing was missed. We also drew standard subsamples from the two carbon samples. The 2.5 g of archaeobotanical materials was distributed among six analytic zones and sixteen features. The average carbon:noncarbon ratio for the site was 0.1% with Zones 3 and 5 producing about 70% of the assemblage weight.

Figure 5-1 shows the carbon ratio and carbon purity of flotation samples by depth, analytic zone and age in radiocarbon years, and Table 5-1 summarizes the entire assemblage by weight, number of appearances in flotation samples, and analytic zone. Zone 5 yielded the most abundant botanical remains as well as most of the edible material.

The flotation sample assemblage consists of 87% wood, 3% edible tissue and 10% other nonwoody tissue. Among the woods, the pine family is well represented and accounts for 44% of the assemblage remains by weight. Pine members are found in 92% of the flotation samples; all genera are represented

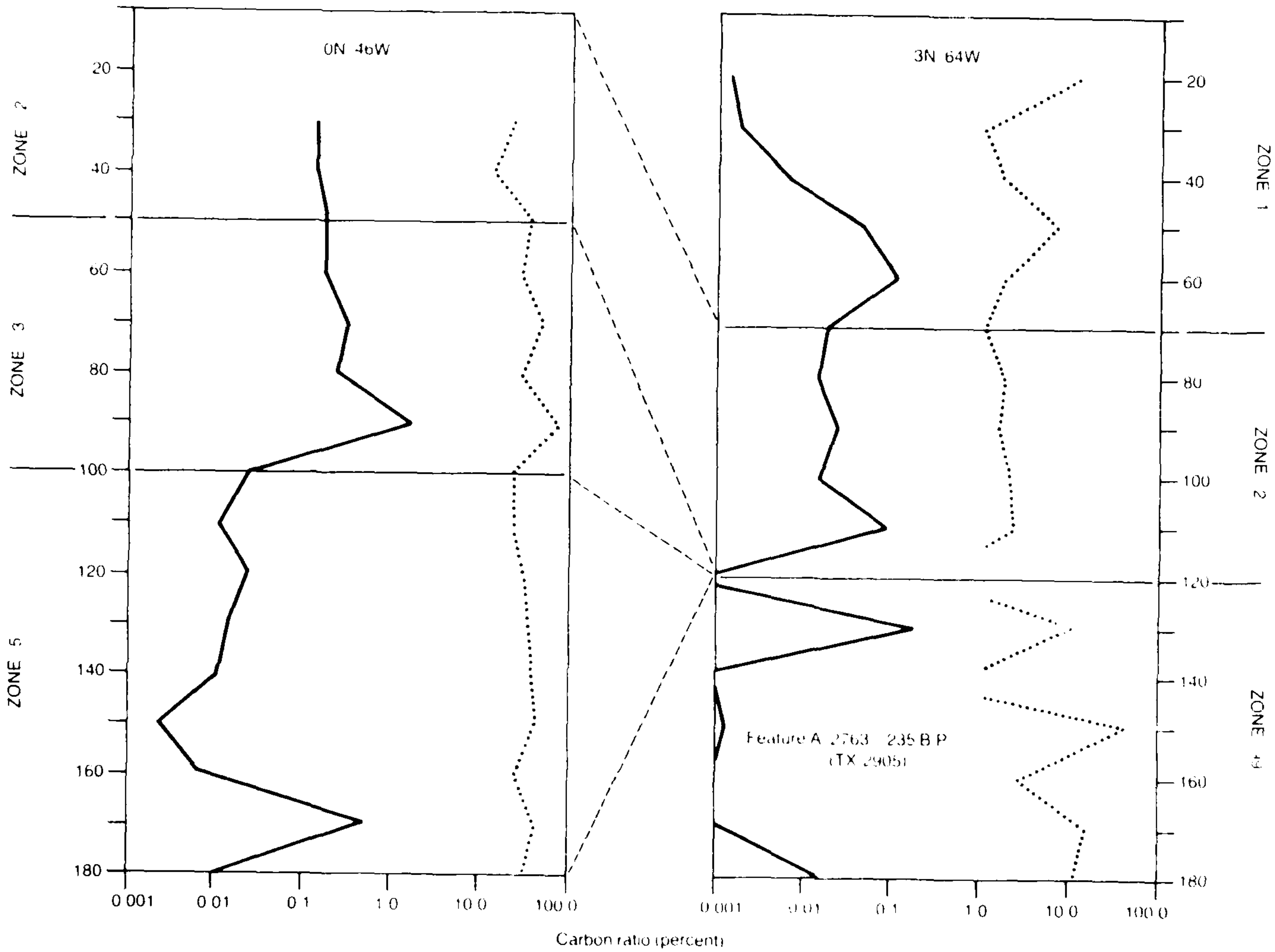

Figure 5-1. Carbon to soil ratio and carbon purity by analytic zone and unit level, 45-OK-258.

Table 5-1. The botanical assemblage by flotation weight (g) and number of appearances (#), 45-OK-258.

Identified Botanical Materials	Zone 1		Zone 2						Zone 3				Zone 4									
	Unit Levels (6 samples)		Unit Levels (8 samples)		Feature 122 (1 sample)		Feature 126 (1 sample)		Unit Levels (5 samples)		Feature 14 (1 sample)		Feature 42 (1 sample)		Feature 73 (2 samples)		Feature 96 (1 sample)		Feature 82 (1 sample)		Feature 110 (1 sample)	
	grams	N	grams	N	grams	N	grams	N	grams	N	grams	N	grams	N	grams	N	grams	N	grams	N	grams	N
Conifer (67%)																						
Lodgepole pine			0.02	1	0.02	1	0.01	1	0.01	3							0.04	1			0.01	1
Ponderosa pine	0.01	4	0.02	2			0.01	1	0.02	4	0.02	1							0.06	1	0.02	1
White Pine																						
Yellow pine	0.01	2	0.01	2					0.06	5					<0.01	1			0.02	1		
Douglas fir	0.03	4	0.01	3	<0.01	1	<0.01	1	0.03	4					<0.01	1					0.01	1
Spruce					0.01	1							0.01	1								
Larch	<0.01	2							<0.01	2	<0.01	1			0.02	1					0.01	1
Hemlock									<0.01	2												
Pinaceae	0.01	1	0.02	2					<0.01	2												
Red cedar									<0.01	2	0.02	1										
Yellow cedar											0.02	1										
Juniper									<0.01	1												
Cupressaceae							<0.01	1					0.01	1								
Bark			<0.01	1			0.01	1			0.02	1					0.01	1				
Cone																						
Pitch	<0.01	1							0.01	3												
Other wood	0.03	5	0.03	6			<0.01	1	0.06	5	0.01	1										
Hardwood (20%)																						
Sage			<0.01	1							<0.01	1					0.02	1				
Rabbitbrush																						
Bitterbrush			0.01	3					0.04	4												
Serviceberry	<0.01	1			0.01	1			0.01	1												
Serviceberry/ Hawthorne							0.01	1	<0.01	1	<0.01	1	0.05	1	<0.01	1	0.01	1				
Rosaceae	<0.01	2							<0.01	1												
Mockorange																						
Maple																						
Poplar											<0.01	1									<0.01	1
Willow																						
Poplar/Willow																						
Hackberry									0.01	1												
Bark					<0.01	1																
Other wood	0.01	1	<0.01	2																		
Edible Material (3%)																						
Seeds	<0.01	2			<0.01	1			<0.01	1			<0.01	1					<0.01	1		
Root			<0.01	1																		
Other											<0.01	1	<0.01	1								
Other Tissue (10%)																						
Seeds			<0.01	1					<0.01	1					0.01	1	<0.01	1				
Grass			<0.01	1					<0.01	1												
Leaf																						
Fiber			<0.01	1																		
Herbaceous stem	0.01	3	<0.01	1					0.01	2												
Nonwoody other	0.02	6	0.04	7			<0.01	2	0.04	5					0.01	1	<0.01	1	<0.01	1	<0.01	1
Total	0.13		0.16		0.04		0.04		0.30		0.09		0.07		0.04		0.08		0.08		0.05	

Table 5-1. Cont'd.

Identified Botanical Materials	Unit Levels (8 samples)		Feature A (2 samples)		Feature 54 (1 sample)		Feature 161 (1 sample)		Feature 24 (1 sample)		Feature 33 (2 samples)		Feature 85 (2 samples)		Feature 123 (2 samples)		Zone 99 (6 samples)		Total (53 samples)
	Zone 5																Zone 99		Total
	grams	N	grams	N	grams	N	grams	N	grams	N	grams	N	grams	N	grams	N	grams	N	grams
Conifer (67%)																			
Lodgepole pine									0.04	1	-	-	0.04	1			-		0.19
Ponderosa pine	0.02	2	<0.01	1	0.02	1		-	0.04	1	0.15	2	0.03	1			<0.01	1	0.42
White pine	-					-			-	-	<0.01	1	-	-			-	-	<0.01
Yellow pine	0.04	7					0.01	1	<0.01	1	<0.01	1	-	-	0.02	1	0.01	1	0.18
Douglas fir	0.04	6	0.01	1			-	-	-	-	0.01	2	0.01	2			0.01	3	0.16
Spruce	0.01	2																	0.03
Larch	0.02	4	0.01	1			0.01	1	-										0.07
Hemlock	<0.01	1	0.01	1				-	<0.01	1	<0.01	1	-				0.02	2	0.03
Pinaceae	<0.01	1		-									0.01	1	-		-		0.03
Red cedar	<0.01	2	<0.01	1	0.01	1					-				-		-	-	0.03
Yellow cedar	-														-	-	-	-	0.02
Juniper	<0.01	2								-	<0.01	1			0.02	2		-	0.02
Cupressaceae	<0.01	1				-			-						-	-		-	0.01
Bark	0.04	6			0.02	1	0.01	1	<0.01	1		-	0.01	2		-		-	0.12
Cone	0.01	2			<0.01	1			<0.01	1	<0.01	2	0.01	1	-	-	-	-	0.02
Pitch	0.01	1		-	<0.01	1				-	0.01	1	-				-	-	0.03
Other wood	0.08	6	0.02	2			0.06	1			<0.01	1	-				0.02	3	0.31
Hardwood (20%)																			
Sage	<0.01	1	-	-	0.04	1											-		0.06
Rabbitbrush	0.01	1															-		0.01
Bitterbrush	0.03	7	0.01	1			<0.01	1	0.01	1	0.01	1			0.09	1	-		0.20
Serviceberry	<0.01	1												-	<0.01	1	<0.01	2	0.02
Serviceberry/ Hawthorn	<0.01	1													0.06	2			0.13
Rosaceae	<0.01	1	-													-		-	<0.01
Mockorange	<0.01	1	0.04	1								-							0.04
Maple	<0.01	1										-						-	<0.01
Poplar												-	-				-	-	<0.01
Willow		-						-	<0.01	1		-	-				-	-	<0.01
Poplar/Willow	<0.01	2		-								-	-			-	<0.01	1	<0.01
Hackbery	<0.01	2			-						-	-	-						0.01
Bark				-	<0.01	1						-	-		-	-	<0.01	1	<0.01
Other wood	0.03	3		-			<0.01	1				-	-				<0.01	2	0.02
Edible Material (3%)																			
Seeds			0.01	1	0.01	1	<0.01	1				-	-			-	-		0.02
Root	0.01	2		-	<0.01	1			<0.01	1	0.01	2					<0.01	1	0.02
Other	0.02	3								-	<0.01	1	0.01	1					0.03
Other Tissue (10%)																			
Seeds	-		<0.01	1	-									-			<0.01	1	0.01
Grass			<0.01	1															<0.01
Leaf																	<0.01	1	<0.01
Fiber													-		<0.01	1		-	<0.01
Herbaceous stem	0.01	3		-													<0.01	2	0.03
Nonwoody other	0.05	7	0.01	2	0.1	1							0.01	2			0.02	4	0.20
Total	0.43		0.12		0.10		0.09		0.09		0.19		0.13		0.19		0.08		2.50

except true fir, Abies. Zone 5 yielded most of the coniferous woods including nearly all of that from the cypress or cedar family (red cedar and juniper). Some of the more exotic woods such as hemlock and red and yellow cedar are incompletely charred.

Hardwoods account for 21% of the assemblage weight. Charred bitterbrush, which occurs frequently, is found in about one third of the flotation samples. Below Zone 1, serviceberry and hawthorn occur often; one or the other wood is found in 28% of the flotation samples. The remaining hardwoods are concentrated in Zone 5. Almost all of them are local shrubby species that grow within a short walk from the site. Two other hardwoods--birch (represented by bark), and maple (possibly represented by wood)--can be found at higher elevations or in moist draws.

Each zone yielded some edible tissue and seeds. From Zones 1, 2, and 4 a few goosefoot seeds were recovered while Zone 3 yielded a single mint nutlet. Edible materials from Zone 5 include portions of two ponderosa pine seeds, a concentration of charred goosefoot (Chenopodium sp., probably C. fremontii) seeds in a pit feature, as well as some root tissue which is probably Lomatium tissue. Other material which may be root cake fragments were found among bones in Feature 24, dated to 2951±107 B.P. (TX-3386) in Housepit 5. Indeed, most of the edible tissues and seeds come from features in Zone 5. The occurrence of Chenopodium seeds, the first among the project sites, is of particular significance because it has been discovered that Chenopodium was an important wild and cultivated pre-Columbian food in parts of South, Central and North America (Asch and Asch 1977, 1978; Simmonds 1965). Popped seeds (C. bushianum mostly) have been found in quantity in archaeological sites dating to the first millenium B.C. in the Midwest and South (Asch and Asch 1977:35). Our popped seeds are at least as old as these and have a reliable carbon date of 2763±235 B.P. (TX-2905).

We also recovered bits of spongy seed coat wall, some of which are charred bitterbrush achenes, as well as a portion of a possible grass seed. Neither grass stems nor leaf tissue are common at the site. A band of fibrous material was found in Zone 2. The remaining material--bits and pieces of herbaceous stem and other nonwoody tissue--cannot be further identified.

The following sections describe the archaeobotanical assemblage from 45-OK-258 by taxa and briefly discuss the subassemblage of each analytic zone.

BOTANICAL ASSEMBLAGE

The assemblage below is arranged alphabetically by family. Possible uses are suggested from information supplied in the ethnobotanical and ethnographic literature. We include seasonality data when pertinent.

APIACEAE (Umbelliferae, Parsley or Celery Family)

Lomatium Raf. (desert parsley, biscuitroot)

Charred Lomatium root tissue was taken from two flotation samples in Zone 5. One is from a bone concentration, Feature 24 in Housepit 5, and has a radiocarbon date of 2951±107 B.P. (TX-3386). The feature also contains pieces of compressed tissue which may belong to a root cake.

Although species cannot be assigned on the basis of root tissue fragments alone, these specimens probably belong to a species with large storage roots such as Lomatium macrocarpum, L. canbyi, or L. farinosum.

Six other samples contained root tissue which may be Lomatium. Traces are from unit levels in Zones 2 and 99. The rest (0.02 g) are from Zone 5 unit level and feature flotation samples from Housepits 3 and 5. Radiocarbon sample 303 taken from a floor in Housepit 5 contained root tissue as well as compressed cake-like tissue that is similar to that found in Feature 24 above. This sample has a date of 2878±216 B.P. (TX-3391).

Thus, while Lomatium tissue and root tissue thought to be Lomatium weigh little (0.02 g), it is present in 15% of the samples and is concentrated in Zone 5.

Lomatium was collected in the spring from March through June (Turner et al. 1980:64-65,68-69). Sometimes it was eaten fresh; while other times, it was boiled and dried, or pit cooked with lily bulbs and bitterroot. At least one kind was made into cakes and dried (Turner et al. 1980:68).

ACERACEAE (Maple Family)

Acer L. (Maple)

A trace of maple charcoal was recovered from a unit level sample in Zone 5. Large maple trees do not presently grow in our area, and our sample is most likely one of two shrubby forms A. circinatum, vine maple or A. glabrum, Rocky Mountain maple. Maple was an important construction wood for the aboriginal peoples of the project area. It has a long history of use in the manufacture of bent wood artifacts, shaped by steaming and bending (Turner et al. 1980:59).

ASTERACEAE (Compositae, Daisy Family)

Artemisia tridentata Nutt. (sagebrush, big sagebrush)

Most of the 0.06 g of sage charcoal is found in Zones 3 and 5 in Housepit 3. A trace was identified from Zone 2 and a charred leaf was extracted from a flotation sample in Zone 99. The ethnographies record no use of the wood in manufacture. It was, however, used for fuel, and the leaves and branches have been used for medicines and in hide-smoking (Turner et al. 1980:79). Sage occurs commonly on terraces and hillsides at the site today. As a consequence, it is surprising that only 9% of the samples contain sage.

Chrysothamnus nauseosus (Pall.) Britt. (rabbitbrush)

Charred rabbitbrush stem wood was found in a unit level flotation sample from Zone 5 occupation debris. Rabbitbrush is a small, slender shrub that grows among sage and bitterbrush. Although nearly identical to sage in woody structure, its stems do not grow large enough to provide a good fuel for cooking fires. It has been used as hide-smoking material in this area (Ray 1932:217; Turner 1979:185-186).

CHENOPODIACEAE (Goosefoot Family)

Chenopodium fremontii Wats. (western goosefoot, pigweed)

Charred goosefoot seeds were taken from 7, or 13% of the flotation samples and from deposits in Zones 1, 2, 4 and 5. Two charred seeds are smaller than C. fremontii and are probably from another species. Western goosefoot was found in two unit levels from Zone 1. They also occur in a pit in Housepit 2 (Feature 122), in a pit in Housepit 3 (Feature 42), in a bone concentration (Feature 82) and a pit (Feature 161) in Zones 4 and 5 in Housepit 5. A large concentration of charred and popped seeds was extracted from Testing Phase pit (Feature A) with a date of 2763±235 B.P.

The number of western goosefoot seeds from flotation subsamples, 15, appears small. However, it must be remembered that these represent a fraction of available archaeobotanical material in each flotation sample (that is, items usually 1.0-2.0 mm in one dimension, and which have a total aggregate weight of 0.10 g). A minimum of eight goosefoot seeds was taken from such a sample in Feature A, a large amount considering much of the sample consisted of contaminants. In fact, the number was so large that we decided to examine all carbon (0.13 g) from both light and heavy fractions. More than 95 seed coat and embryo fragments yielded a minimum of 55 seeds (minimum number obtained by counting entire and nearly entire dorsal seed coat halves). In other words, over 50 seeds were extracted from 1.6 kg of soil. We shall demonstrate that this quantity compares favorably with published yields of

small seeds of similar age from Midwestern sites (see discussion of Feature A, Zone 5 in the following section).

Because this is the first documented chenopod cache recovered in the Columbia Basin, some discussion of seed morphology is necessary. Plates 5-1 and 5-2 and Figure 5-2 show diagnostic features of the seed coat and embryo. The seed surface is sculptured: radially striate on one side, often obscurely to strongly rugulose on the other. Many seeds have a slight rim. In general, the charred seeds (N=80) are elliptical and about 1.1 mm in diameter with a range of from 0.09 to 1.2 mm. Fine measurements from the prominent beak to the opposite side average 1.08 mm (measurements were taken on 80 seeds or half seeds). Perpendicular to that, the seeds average 1.05 mm in diameter. Seven seeds were so complete that we could determine seed width--about 0.06 mm. Three seeds have bits of pericarp--thin chaffy tissue enclosing the seed--adhering to their surface. The tissue is reticulate, and separable from the surface.

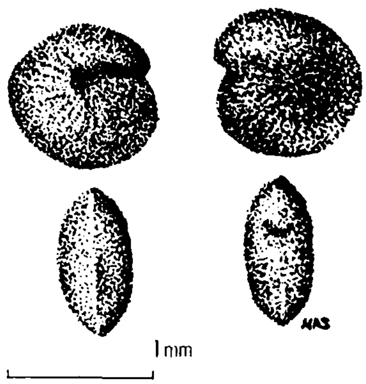

Figure 5-2. Dorsal, ventral, and side views of western goosefort seeds.

Three western species, L. fremontii, C. incanum, and C. atroverens match this description (Wahl 1954:24-25). We do not have enough material to make a finer distinction than that. It may be, however, that the three putative species are varieties of C. fremontii (Hitchcock et al. 1964:Vol. 2:189-199). This is our judgement also.

Western goosefoot is found in the study area; indeed, it occurs with three other Chenopodium species (two of which are edible) on the Chief Joseph laboratory grounds. Chenopodium fremontii was still green in October, 1982, and could have been harvested a week later. The seeds, in short, are a later fall crop.

While the ethnobotanical literature of our area mentions two goosefoot species (C. album, C. capitatum) (Turner et al. 1980:96,114), it says nothing about their use as food. Goosefoot, however, has a long history as an important food plant yielding both pot greens and nutritious seed. White goosefoot (C. album) was eaten in Iron Age Europe (Renfrew 1973:170). Pre-Columbian domesticated chenopods are known from South America and Mexico (Simmonds 1965) and possibly from Eastern North America as well (Asch and Asch 1977). Intensive wild seed collection (C. bushianum) is documented for Terminal Archaic or Early Woodland sites as old as 700 B.C. (Asch and Asch 1977:35). The seeds from Feature A are at least as old as these published dates.

CUPRESSACEAE (Cypress Family)

Cypress family members appeared in 14, or 26%, of the samples.

Chamaecyparis nootkatensis (D. Don) Sprach (Alaska cedar, yellow cedar)

Approximately 0.02 g of yellow cedar charcoal was found in a hearth-like feature (Feature 14) in Housepit 3, Zone 3. All is mature bole wood, similar to that found at 45-OK-2 and 45-DO-214. This sample, however, is older than that from other sites, and fully charred, unlike these other specimens. Yellow cedar is a coastal species not presently found on the Colville Reservation. Its distribution east of the Cascades is spotty. The nearest source is the Slocan Lake region of British Columbia (Hosie 1979:102). A mature log was observed in a pile of river drift near Grand Coulee Dam in 1981. With a wood much like that of red cedar, yellow cedar was used by Northwest Coast Indians for many purposes. Bows from the wood are said to have been desirable and were widely traded into the interior (Turner 1979:70-71).

Juniperus scopularum Sarg. (juniper)

Charred and partially charred juniper wood was found in 9% of the samples, nearly all from Zone 5. In Housepit 5, juniper is found in features with dates ranging from 2790 to 2880 B.P. Some juniper from a hearth-like feature (Feature 123) on an occupation floor (Feature 33) is incompletely charred.

Juniper trees are not common within the guide-taking area. A few have been seen on the lower Nespelem River and Coyote Canyon and there are stands at the water's edge on the Douglas County site of the Columbia River above RM 590. The tough, close-grained wood was used for bows and small construction purposes, the boughs to fumigate houses, and the steeped bark and branch tips were used to treat colds, flu and other disorders (Turner et al. 1980:19-20).

Thuja plicata Donn (red cedar, western red cedar)

Charred and partially charred red cedar wood is found in Zones 3 and 5--in 13% of the samples. Five of seven samples contain pieces of incompletely charred wood. None exhibit signs of wear or manufacture. Ray observed that the Sanpoils pulled logs from the river to be made into canoes, paddles, or planks for semisubterranean houses, as well as bow staves and cooking utensils (1932:31,119). The wood was also used for salmon splints and fish poles (Post 1938:15). The nearest present source of red cedar trees occurs at Barnaby Creek about 40 km (24 miles) north of Inchelium on the Columbia River.

Other Cupressacaeae

A small amount of carbonized wood from the family appears in Zones 2, 3, 4 and 5. The pieces were too small to identify to genus. Also, 0.02 g of conifer bark in Zone 5 (Feature 14) is red or yellow cedar bark. The outer bark of red cedar was sometimes used to cover sweathouses and to insulate other structures (Post and Commons 1938:39; Turner et al. 1980:20). But the use of the softer, inner fibrous bark does not seem common. It was occasionally made into matting and baskets (Turner et al. 1980:20).

HYDRANGEACEAE (Hydrangea Family)

Philadelphus lewisii Pursh (mock orange)

Mock orange charcoal is present from two flotation samples in Zone 5. We have grown accustomed to small amounts of this shrub in the site assemblages. At present, mock orange bushes are found at the base of rock outcroppings and talus slopes nearby. The wood was a preferred material for recurved, sinew-backed bows and snow-shoe frames (Ray 1932:87-88,121) and for implements such as digging sticks, arrow shafts, and harpoon parts (Turner et al. 1980:108). Mock orange stems could also be used as handy kindling. Slight as they are, however, they could not be useful as fuel for a fire of any duration.

LAMINACEAE (Labiatae, Mint Family)

A small, incomplete nutlet less than 1.0 mm long was found in a unit level flotation sample in Zone 3. Charred, with most of its seed coat missing, it resembles nutlets from the genus Hedeoma (pennyroyal). The plant was not used by the Okanogan-Colville Indians, although several other members of the mint family were gathered as herbal teas and medicines (Turner et al. 1980:109-110).

PINACEAE (Pine Family)

The pine family is well represented in samples from 45-OK-258 and appear in 50 of 53, or 94% of the samples. All genera but true fir (Abies spp.) appear. Every feature contains one or more members of the family. Only two unit level flotation samples lack remains (one of those contained no charcoal at all).

Larix occidentalis Nutt. (Western larch, tamarack)

Larch wood is found in every zone. It occurs in one third of the unit level flotation samples, and appears in 40% of the features. It appears in 15 of 53, or 28% of the samples, and ranks fourth in frequency among the conifers present at the site. One sample from Feature A in Zone 5 is incompletely charred.

Favoring moist habitats, larch trees grow as low as 575 m (1900 ft) in the Smith Creek drainage along Highway 155 north of Nespelem. Others are found in shaded environments in the Condon-Harrison-Coyote Creek drainage above 540 m. The wood does not seem to have been preferred construction material for the Okanogan and Colville peoples. It was used as fuel. A tea was prepared from its spring needles, and its gum was sometimes chewed (Ray 1932:105; Turner et al. 1980:25). In the highlands, larches support edible tree lichen ("black moss," Byronia fremontii), and exude sap that can be collected in quantity (Turner 1978:53; Turner et al. 1980:10-12).

Picea A. Dietr. (spruce)

A small amount of spruce was identified from five flotation samples distributed among features in Zone 2 (Feature 122), Zone 4 (Feature 42), and two unit levels from Zone 5. That from the the features was charred. Unit level spruce was incompletely charred. The wood is most likely Engelmann (P. engelmanii) or white spruce (P. glauca). The nearest source for Engleman spruce is Disautel Pass and adjacent mountainous regions above 900 m (3000 ft).

<u>Pinus contorta</u> Dougl. ex Loud. (lodgepole pine)

Lodgepole pine charcoal is found in Zones 2, 3, 4 and 5. It appears in 19% of the samples. It is found among unit levels in Zones 2 and 3 and from Housepit Features in Zone 2 (Features 122 and 126 in Housepit 2), Zone 4 (Features 96 and 110 in Housepits 3 and 5, repectively), and Zone 5 Housepit 5 (Features 24 and 85). A few pieces in Feature 96 are incompletely charred. Some of this charcoal is about 2,900 years old.

Young lodgepole pines are suited for construction purposes. The trees are found at slightly higher elevations than ponderosa pines on the Colville Reservation.

<u>Pinus ponderosa</u> Dougl. ex D. Don (ponderosa pine)

Ponderosa pine is the most commonly encountered wood at the site, appearing in 43% of the samples. It is found in all zones and in 10 of the 15 features for which we have samples. In addition, all of the cone fragments from Zone 5 and pine seed fragments from Feature 54 in Housepit 3, Zone 5 are ponderosa. An undetermined amount of bark is from this pine as well. All of the material is completely charred.

Ponderosa pine is the largest type of tree found within walking distance of the site. While it had many uses in native manufacture, medicine, and food, most often it was probably used as fuel (Turner et al. 1980:32).

Other Pine

A small amount of soft, or white, pine (probably <u>P. monticola</u>) with a date of about 2900 years was recovered from a floor (Feature 33) in Housepit 5, Zone 5. Yellow pine was taken from all zones and from six features in Housepits 3 and 5, for a total of 43% of the samples. We use the term "yellow pine" to refer to either ponderosa or lodgepole pine, when we cannot precisely determine the species. One piece of pine from Zone 1 (Flotation sample 84) is pitch-coated and may be artifactual.

Members of the genus <u>Pinus</u> are found in 40, or 75%, of 53 samples. One feature lacks pine; several unit levels in Zone 3 and 99 also lack pine in testing phase unit 3N64W.

<u>Pseudotsuga menziesii</u> (mirb.) Franco (Douglas fir)

Found in all zones, Douglas fir wood is surprisingly common at 45-OK-258. It was noted in 30, or 57%, of all samples. Although other wood species weigh more, Douglas fir appears in more samples. This might not be the case if we could identify yellow pine to species. Douglas fir currently grows

among ponderosa pine, above the floodplain and in draws. Fir was a preferred wood for water-associated tasks. It was made into harpoon shafts, for instance, because of its resistance to water warp (Post and Commons 1938:55,56). Some Douglas fir pieces in Zones 2, 3 and 5 are incompletely charred. One charred piece from Zone 99 (Flotation sample 93) has been abraded with a fine substance obliquely to the long axis of the cells.

Tsuga Carr. (Hemlock)

Hemlock is one of the more exotic species at 45-OK-258. It may not grow in the project area today. The closest source by river is probably Arrow and Slocan Lakes in British Columbia.

Charred and incompletely charred hemlock bole wood is found in Zones 3, 5 and 99, and was identified in 15% of all samples. Unit level flotation samples from Zones 3, 5 and 99 yielded hemlock wood and a bone concentration dated to 2900 years ago (Feature 24) in an occupation floor (Feature 33) in Housepit 5 yielded charred hemlock wood. Nearly all of the hemlock, however, is found in Feature A and in unit levels associated with Feature A in 3N64W. Hemlock tends to be found in samples containing cypress family members, or in samples that have incompletely charred wood. Use of this wood is not reported in the ethnobotanies of our area.

Other Pinaceae

Seven flotation samples have samples of charcoal which belong to the pine family (the samples are too small to be identified to species). Pine members are found in unit levels in Zone 1, 2, 3 and 5, and in Feature 85 in Housepit 5.

Cone, Bark and Pitch and Other Conifer Wood

Pine cone fragments are found in five flotation samples from unit levels and features in Housepits 3 and 5 in Zone 5. Found in 28% of the samples from Zones 2, 4 and 5, conifer bark is much more common. Zone 5 contains most of the bark: it is found in three-fourths of the unit level flotation samples and in most of the Zone's features. Three flotation samples from Zones 3 and 5 have samples with conifer pitch adhering to the charred wood.

Approximately 0.31 grams, or 19% of the conifer remains by weight, could not be identified to family. In general, the fragments are too small to identify. Age may be a factor: about half of the amount is from Zone 5.

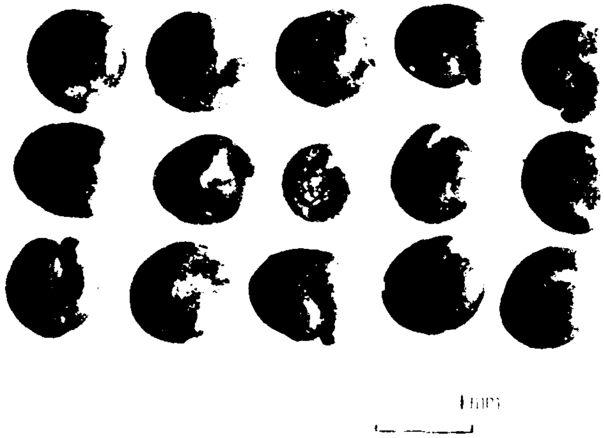

Plate 5-1. Charred goosefoot seeds, Feature A, Zone 5, 45-OK-258.

Plate 5-2. Closeup of charred goosefoot seeds from Feature A, 45-OK-258.

POACEAE (Gramineae, Grass Family)

Traces of grass stems were found in Zones 2, 5 and 99. So scanty are the remains we can only say that they were from medium-sized grass. Site 45-OK-258 is somewhat unusual in having so few traces. We expect to find grass in housepits, particularly because grass was often used as flooring material and packing material (Turner 1979:141; Turner et al. 1980:53-54).

ROSACEAE (Rose Family)

The Rose family is fairly well represented in the flotation samples from 45-OK-258. Combining all rose taxa, approximately 0.35 g of charcoal was identified in 30, or 57%, of the samples. The rose family ranks second in weight and number of appearances among the botanical families represented by the site assemblage.

Amelanchier alnifolia Nutt. (Serviceberry, saskatoon)

Small amounts of serviceberry charcoal were found in all zones but Zone 4, and in 13% of the flotation samples. We could not positively identify any seeds or fruiting material although seed wall fragments and fruit tissue which resemble those of serviceberries are found in Zones 4 and 5. Serviceberry wood is suited for small artifacts such as digging sticks, arrow shafts and the like (Ray 1932:98; Post and Commons, 938:53,55,58,60). The wood is commonly available in the talus garland association and in draws and canyons.

Purshia tridentata (Pursh) D.C. (bitterbrush, greasewood)

At 0.20 g in 19, or 36%, of the samples, bitterbrush would seem to be the most common hardwood at the site. Its occurrence however, is spotty. It is found in Zones 2, 3 and 5 in unit level materials from one testing phase unit; in Feature A, and in four features from Housepit 5. It is absent from unit level materials from the other testing unit (3N64W).

Bitterbrush wood was not utilized for tools or other artifacts; the southern Okanogan used it to give hot fire, in the initial stages of pit cookery (Turner et al. 1980:128). In Housepit 3, where bitterbrush was not identified, sage may have been used for this purpose.

Serviceberry/Hawthorn

Ten flotation samples, from Zones 2, 4, 5 and 99, contained charcoal which may be either serviceberry or hawthorn (Crataegus sp.). Most of this charcoal is from features within Housepits 3 and 5. Some of the material is

quite old and in poor condition; it is, therefore, difficult to assign to genera.

Other Rosaceae

A trace of roseaceous charcoal was identified from two flotation samples from Zone 2 and from single flotation samples from Zones 3 and 5. More precise identification could not be made.

SALICACEAE (Willow Family)

The willow family had a multitude of uses: fuel and hide-smoking wood; use in artifacts requiring flexibility, such as cordage, basketry, and fish traps; and as a source of a durable glue, a cleansing agent, and medicinal tea (Turner 1979:253-265; Turner et al. 1980:134-137).

Populus L. (poplar, aspen)

Features 14 and 110 from Housepit 3 contained traces of charred and incompletely charred poplar. Quaking aspen (P. tremuloides), a tree common to draws and moist ravines in the area, may be the species represented.

Salix L. (willow)

Feature 24 from Housepit 5 also contained a trace of incompletely charred willow. Because of the smallness of the specimen and its charred character, we could not make a more precise identification.

Populus/Salix (Poplar/Willow)

Three unit level flotation samples from Zones 5 and 99 show traces of poplar or willow charcoal. Further taxonomic determination cannot be made.

ULMACEAE (Elm Family)

Celtis douglasii Planc. (hackberry)

This small tree is common to terraces and rocky garland communities near the site. Hackberry charcoal was examined from two unit level flotation samples from Zone 3 and 5. The wood is not mentioned in regional ethnobotanies; its tough and durable character may, however, have made it useful for some purpose.

Hardwood Bark and Other Wood

Three samples contained charred hardwood bark, one of which is likely a piece of birch bark (Betula sp.) from Feature 122 in Housepit 2. The remaining charcoal can only be described as diffuse hardwood.

OTHER TISSUE

As in most sites, the last large category on Table 5-1 contains numerous bits of miscellaneous tissues and seed parts which often cannot be assigned to family. At 45-OK-258, seven seed fragments have spongy seed coats and probably belong to bitterbrush plants. The fibers, or fibrous tissue in Zone 2, and Feature 123 of Zone 5, appear to be the softer inner fibrous bark of a hardwood species such as birch, willow or perhaps poplar. That of Feature 123 appears manufactured.

SUMMARY BY ANALYTIC ZONES AND DISCUSSION

The botanical assemblage from 45-OK-258 is summarized below by analytic zone. Zones are discussed in reverse numerical order, with the oldest first.

ZONE 99

Unit Levels 130-180 in test unit 3N64W were not zoned because they could not be readily correlated with zones in nearby salvage units. For convenience in reporting this material in this chapter, it has been labelled Zone 99. It is likely that the bulk of this material is equivalent to Zone 5. Testing Feature A, a pit in the southern quad extending from UL 150 to 180, is assigned to Zone 5 on the basis of its radiocarbon date, 2763$\mp$235. The feature materials are discussed in the Zone 5 section, below.

Six flotation samples (Flotation samples 91-96) from unit levels 130 to 180 in testing unit 3N64W yielded over 0.08 g of botanical material for a zonal carbon ratio of 0.05%. Purity ratings vary from near 0 to 60% in unit level 150. Although Figure 5-1 shows Feature A within the sediments of Zone 99, radiocarbon dating indicates that it belongs to Zone 5, and so we discuss it in the next section. Unit levels from 130 to 150 may belong to Zone 5 as an occupation layer from which pit Feature A was excavated.

In general, most of the botanical materials were charred. Three-fourths of the remains consisted of conifer, including pine, Douglas fir, and western hemlock. Some of the hemlock is incompletely charred. One small fragment of Douglas fir shows smoothing marks.

At 1% of the zonal assemblage, the quantity of hardwood, consisting of serviceberry and poplar/willow charcoal, is very low, considering the site average is 20%. Although the zone is old, preservation factors are good. Delicate materials such as grass, leaf (sage), bark, seed, and root tissue

contribute about 25% of the total assemblage recovery by weight. Thus, the low hardwood figures are not due to poor preservation.

Although the purity ratings vary considerably from one flotation sample to the next, the lack of purity is not caused by bioturbation. Rather, it is due to the occurrence of nonbotanical cultural materials, mostly charred and unburnt fish and other bone, shell, a few flakes and at least one lump of red pigment. The amounts of nonbotanical materials are greatest in Unit Levels 130 to 140. Unit Level 140, for instance, contains only two pieces of charcoal in the 0.01 g subsamples. Approximately 99% of the sample is occupational debris--bone, shell and pigment. Unit Level 150, however, has most of the floral material, 0.05 g by weight, along with burnt bone and shell. The varied botanical material consists of seed material, and at least six woods, including a striated or worn piece of Douglas fir and incompletely charred western hemlock. Incompletely charred hardwood bark is found in unit level 170, and lomatium-like root tissue in Unit Level 180.

ZONE 5

Zone 5 is represented by 1.34 g or 54% of the botanical assemblage from 45-OK-258, extracted from 19 of the samples. The carbon:noncarbon ratio is 0.3%. The samples comprise eight testing unit level flotation samples (Flotation samples 129-136) from 0N64W, one flotation sample from Feature 54 in Housepit 3, and 7 flotation samples from Features 33, 85, 161, and 123 in Housepit 5. In addition, one radiocarbon sample (RC303) and one miscellaneous carbon sample (Master #138) were subsampled from Features 33 and 24 respectively. Some features range in age from about 2950 to 2760 B.P. making them some of the oldest features yet examined containing incompletely charred material.

As a whole, the zonal assemblage consists of 64% conifer, mostly pine, 25% hardwoods, mostly bitterbrush charcoal, 5% edible material and 6% botanical tissue of other kinds. Edible material consists of charred and popped goosefoot seeds, pine nut material, lomatium root and other compressed root-like tissue. The edible percentage is large compared to the site average of 3%.

Of the woods, ponderosa pine weighs most and appears in 42% of the samples. Douglas fir weighs less, but appears in 58% of the samples. Larch appears in 32% of the flotation samples, and juniper in 25%. Exotic woods such as red cedar and hemlock appear in 20% of the samples and are fairly common throughout this ancient zone.

Some conifer wood is incompletely charred, including yellow pine, Douglas fir, spruce, red cedar and hemlock. Their cells are dark brown and darkly translucent. Whether this condition is heat-caused or is the consequence of aging is not yet known. The term "incompletely charred wood" is not meant to distinguish between the two processes; rather it is used to distinguish charcoal from items not having the appearance of charcoal.

A few samples have a little sage and mock orange charcoal. Maple, willow, poplar, rabbitbrush and hackberry are present. Some serviceberry, poplar and pop/will wood is incompletely charred.

Unit Level Material

Zone 5 unit level material is from 0N46W, at the edge of Housepit 3. A little over 0.43 g of botanical material was extracted from 8 samples for a fairly high carbon ratio of 0.1%. The flotation samples were apparently taken close to an inner edge of the structure. Thus the assemblage, which consists of 64% conifer, 16% hardwood, 7% edible and 14% nonwoody tissue, may represent Housepit 3 only.

Edible botanical tissue, lomatium and root-like material, is plentiful. Delicate, poorly preserved nonwoody tissue is another category which is large compared to the site assemblage average. The high carbon ratio of the zone (0.1%) may be attributed to the possible protection provided by a structural wall. Carbon purity of the samples is remarkably uniform throughout the zone; subsamples produced from 0.03 to 0.06 g of carbon each. The non-floral remains consist of burnt and unburnt fish and other bone, shell, lithic flakes and pigment lumps ranging in color from red-orange to yellow. Field observers noted numerous shell and bone fragments from the top of the Zone to UL 150 and described a shell concentration in UL 110. Flotation sample 129 taken 50 cm from this concentration contained larch and bitterbrush charcoal as well as incompletely charred spruce, yellow pine and red cedar. Sixty percent of the subsample by weight was fish bone, lithics, shell and other bone.

The botanical peak of Zone 5 was reached in UL 170. The carbon ratio of 0.3% is the highest of the entire site. Because ratios exceeding 1% tend to come from features and occupation layers, we suspect that an occupation layer lies nearby. Although described as sterile (the unit was terminated at 180 cm), this level contains a plethora of species--fir, larch, pine, juniper, rabbitbrush, hackberry, bitterbrush, partially charred serviceberry/hawthorn wood, bark and lomatium root.

Feature Materials

Zone 5 is represented by a hearth-like feature in Housepit 3, three hearths or firepits, one floor, and a bone concentration in Housepit 5 and a firepit north of Housepit 4. All samples from these features also contained burnt and unburnt fish, shell and other bone, small lithic flakes and some orange to red pigment lumps. Altogether, the housepit and Feature A produced 0.93 g of charred and incompletely charred material and an average feature carbon ratio of 0.2%.

Housepit 5 features contain 70% conifer wood, 24% hardwood, 3% edible tissue, and 3% other tissue. This slightly exceeds the site average for conifer, hardwood, and edible tissue, and is slightly less than the site average for nonwoody tissue. All features contained yellow pine (mostly

ponderosa pine) and most had bitterbrush charcoal. An occupation floor (Feature 33), and three firepits (Features 85, 161, and 123) held a great amount of conifer wood and charcoal--85% or more of the sample weight. A bone concentration (Feature 24) contained a mixture of 80% serviceberry and serviceberry/hawthorn charcoal and 20% conifer.

The floor material (Feature 33) contained more kinds of botanical material than other features in Housepit 5. This material may have accumulated as refuse from various burning and manufacturing activities in the structure. Like pit Feature 85, the floor materials held Douglas fir and spruce, and, like the bone concentration, hemlock, pine cone material, and lomatium root.

Edible material consists of seed and root material. Hearth 161 contained two goosefoot seed halves and a popped goosefoot embryo (C. fremontii). Floor 33 contained lomatium root and compressed starchy root material dated to 2878±216 B.P. (TX-3391). Bone concentration 24 had lomatium tissue and starchy caked material with a date of 2951±107 B.P. (TX-3386). The goosefoot indicates fall gathering, while caked material is suggestive of winter meals.

Feature 54 in 2N48W, Housepit 3, a stained region near an entryway, yielded Flotation sample 29, which has a high purity ratio of 95%, and a high carbon ratio of 0.5%. The nonbotanical contents of the flotation sample (both heavy and light fraction) consist of bone, shell and a few lithic flakes. The charred botanical remains are 50% conifer, mostly ponderosa pine branches, and 40% sage. Small amounts of red cedar, pine cone, pitch, conifer and hardwood bark are also present. Edible materials such as pine seeds (minimum of two) and root material, possibly lomatium, comprise 5% of the subsample weight. Like two other of the zone's features, it held relatively low amounts of coniferous woods in relation to hardwoods.

The most interesting botanical feature in Zone 5 is testing Feature A in 2N64W. A stained, flat-bottomed oval pit with sloping sides, it was first described in UL 150 and it terminated in UL 180. It lies half outside the testing unit. Samples from the center (Flotation samples 97, 98) indicated that the bottom of the pit contained conifer charcoal--charred larch, Douglas fir, and hemlock--along with a few goosefoot seeds, C. fremontii. Other remains in the flotation sample were mainly fish bone, mammal bone, and shell.

The middle of the pit held numerous goosefoot seeds. Here, at least 50% of the charcoal was bitterbrush and mock orange branches and twigs. About 30% was charred ponderosa pine, Douglas fir, and incompletely charred red cedar and larch.

The remaining botanical material consists of about 10% charred and popped goosefoot seeds as well as a few fragments of unidentified seed matter, and 10% grass and other nonwoody tissue. We could discover no other chenopodium tissue such as leaf or stem parts, and so we assume that entire plants were not introduced into the features. The heavy fraction, 70% by weight, held a great amount of mussel shell, as well as fish and other bone. A shell layer extended across half of the feature at this level. Some shells were open but

still hinged; some were open and stacked together as if shucked or tidily gathered. The feature also contained red-stained earth and bone, which was most concentrated at the top of the feature above the shell. The pit, then, is stratified with fuel charcoal at the bottom, mussel, goosefoot, some fish and other bone in the middle along with twigs and branches of hardwood shrubs, grass, incompletely burnt conifer wood and charcoal. A radiocarbon sample taken from beneath this level dates to 2763±235 B.P. (TX-2905). The presence of goosefoot indicates that at least one episode of burning was in the fall.

The number of goosefoot seeds is large in comparison to published figures from cache and midden accumulation in parts of Eastern North America. In that region, seed numbers are often reported in relation to weight of recovered carbon (such as seeds/g carbon). It is not difficult to compare figures. Flotation sample 97, for instance, held a total of 55 goosefoot seeds in a little over 0.36 g of charcoal from 1.6 kg of sediment. A flotation sample over three times this weight should have yielded a gram of charcoal and an estimated 150 seeds.

Asch and Asch note that Salts Cave, Kentucky had recovery rates which varied between 39-55 seed/g from sediments which date from 290 to 710 B.C. (Asch and Asch, 1977:35, 1978:331). Feature A, which probably falls between a date of 578 and 1048 B.C., meets or exceeds these figures.

Small seed recovery from 23 sites in the Lower Illinois River Valley in Early Archaic to Mississippian periods vary from less than one seed to over 550/g of carbon (Asch and Asch 1978:332-333). Sites closest to Feature A in age include three Late Archaic sites with dates of 110 B.C. and older, and four Middle Woodland sites with dates no older than 150 B.C. (Houart, 1971). None of these sites have a recovery rate exceeding 12 seeds/g of carbon.

ZONE 4

Zone 4 is represented by features in Housepit 3 and 5. These include pit Features 42 (Flotation sample 12) and 96 (Flotation sample 28) and hearth area Feature 73 (Flotation samples 15 and 16) from Housepit 3, and pit Feature 110 (Flotation sample 60) and bone concentration, Feature 82 (Flotation sample 45) in Housepit 5.

The feature assemblage consists of 0.32 g of charred botanical material with purity ratings from 20-80%, and an average carbon ratio of 0.03%. The assemblage contains 69% conifer 25% hardwood, 3% edible material, and 3% nonwoody tissue. Edibles include a few goosefoot seeds from the Housepit 5 bone concentration, and from a pit in Housepit 3. A portion of a grass seed which might be considered edible was found in a hearth from Housepit 3.

Fully 95% of the conifer wood is from the pine family, and most of that is from the pine genus. About 5% of the conifer wood belongs to the cypress family. No species of conifer appears in more than 2 flotation samples, but lodgepole, yellow pine, larch, and Douglas fir appear in both housepits. The relatively rare spruce and cypress family wood appear only in Housepit 3, while the more common ponderosa appears in both Housepit 5 features. The most

frequently occuring conifers, in order of weight and number of appearances, are ponderosa pine, lodgepole pine, larch and Douglas fir. Some of the lodgepole pine is incompletely carbonized branch wood from Housepit 3.

Serviceberry/hawthorn charcoal appears in all features of Housepit 3. Sage and poplar both come from Housepit 3. Some of the serviceberry/hawthorn wood and the poplar was already in poor condition when it was charred. This fact, and the samples' low carbon ratios, make us suspect that conditions for preservation were not so favorable as in Zone 5.

Housepit 5 bone concentration Feature 82 contains about 99% charred pine and a minimum of two charred goosefoot seeds. One of these is C. fremontii. Here, as in the Housepit 3 hearth of Zone 5, the samples contained goosefoot seeds, and fish bone, bone and shell.

Pit Feature 110 in Housepit 5, located less than two meters from the bone concentration, has a date of 2565+145 B.P. (B-4303) that may serve to date the bone as well. The pit contained roughly equal quantities of ponderosa pine, lodgepole pine, Douglas fir and larch with a trace of poplar and nonwoody tissue. Bone and shell, but not fish, were noted among the non-floral remains.

Pit Feature 42 in Housepit 3 contains charred spruce and cypress wood in equal amounts, a great deal of serviceberry/hawthorn wood in poor condition, a minimum of one goosefoot seed (species unknown), and a trace of non-woody tissue. This is the only feature in Zone 5 in which hardwood outweighs conifer charcoal.

A second pit, Feature 96, contains lodgepole branch charcoal and partially charred wood, conifer bark, sage and serviceberry/hawthorn charcoal. Conifer contributes about 63% of the subsample weight. A small fragment of seed coat was also found in the sample. It is unidentifiable, but appears not to be from an edible species. Although sage charcoal is not common, it has been found in unit level and a feature flotation sample from Zone 5 in this housepit.

Hearth Feature 73 from Housepit 3 contains a little larch, a trace of pine and Douglas fir charcoal, and a portion of charred grass seed from a fairly robust seed head (possibly Agropyron or Elymus bunchgrasses). Although some non-woody tissue appeared in the flotation sample, we observed no grass stem or leaf tissue. At 20%, purity ratings are very low for a hearth feature. Fully 80% of the sample consists of burnt and unburnt shell, fish and other bone, numerous fine flakes of diverse materials, and lumps of pinkish red pigment. The heavy fraction also contains two small pieces of polished bone.

ZONE 3

Analytic Zone 3 is represented by five unit level flotation samples (Flotation samples 124-128) from 0N64W on the edge of Housepit 3 and by firepit Feature 14 (Flotation sample 8) in Housepit 3. The zonal assemblage consists of 0.39 g of botanical materials with purity ratios from 40 to 99%

and an average carbon ratio of 0.4%, which is the highest of any zone at 45-OK-258. The assemblage consists of 72% conifer, mostly pine, 15% hardwood, mostly bitterbrush, less than 1% edible material, and 13% nonwoody tissue. Edible tissue consists of a burnt nutlet from the mint family, and a trace of root tissue. Pine family members make up about 50% of the conifer remains, while cypress family members (red cedar, yellow cedar, and juniper) make up 14% of these remains, the largest proportion of any zone. All red cedar in the zone is partially carbonized.

Bitterbrush is found in all flotation samples except that from Feature 14, which has sage instead. The fairly common serviceberry and serviceberry/hawthorn wood is second in importance. Sage, hackberry and poplar appear once. Incompletely charred hardwoods include all of the poplar and one sample of bitterbrush from UL 80.

Unit Level Materials

Unit level botanical materials are abundant. Each flotation sample sample contains at least three species of wood, one of which is always pine. Most contain lodgepole, ponderosa and bitterbrush charcoal.

Three botanical peaks occur in the unit level materials. The first, in UL 70, consists of a diversity of wood species. This level's subsample (80% conifer, 20% hardwood) contained ten species, including all pine genera from the site except spruce, plus juniper, red cedar, bitterbrush, serviceberry and willow, or poplar.

The second peak, in UL 80, is marked by a diversity of non-woody tissue types. With the conifer at 60% and hardwood at 20%, the remaining 20% is made up of a miscellany of non-woody substances such as conifer pitch, grass stems (possibly bunchgrass), mint nutlet, bits of unidentified seed coat, herbaceous stem material and bits of other tissue.

The third peak is the Zone's highest carbon yield, 0.7% in UL 90, which is the second highest at 45-OK-258. The sample contains neither UL 70's diversity of woods nor UL 80's diversity of non-woody tissue. The amount of charocal in the sample is so high, however, that it may signal the existence of a feature nearby. The subsample assemblage consists of 56% conifer, including both yellow pines, fir and hemlock, 44% hardwoods, mostly bitterbrush, and a trace of hackberry and serviceberry charcoal. Contaminants, at 10% by weight, include small lithic flakes, burnt and unburnt bone and some shell.

In short, the upper three levels of Zone 3 are remarkable. They form a layer of occupation debris at least 30 cm thick at the southeastern periphery of Housepit 3.

Feature Materials

Feature 14, an oval firepit at the western edge of Housepit 3, is represented by one flotation sample from the middle level of the deposits. Ninety-four percent of the botanical remains are conifer, equally divided among ponderosa pine, yellow cedar, cedar bark and incompletely charred red cedar. A trace of larch is present. The remaining 6% contains sage, serviceberry/hawthorn, incompletely charred poplar, and a trace of charred root material. The carbon ratio is high, 0.6%, and the subsample was remarkably free from non-botanical materials with a purity rating of 99%. The few nonbotanical remains include lithic flakes, fish bone, other bone, and shell flakes.

Neither yellow cedar, poplar nor sage are found in unit level samples. No other sample at the site contains yellow cedar. Sage and poplar are found in other zones in Housepit 3.

ZONE 2

Zone 2 is represented by three unit level flotation samples from 0N46W (Flotation samples 121-123), five from 3N64W (Flotation samples 86-90) from 0N64W, and Features 122 (Flotation sample 37) and 126 (Flotation sample 38) in Housepit 2.

The samples contained 0.24 g of botanical carbon and produced a zonal carbon ratio of 0.05% and purity rates from 0 to 60%. Botanical materials from 0N46W were ten times the amount from unit 3N64W. In fact, the five flotation samples produced only 0.02 g of the assemblage weight.

The assemblage is comprised of 71% conifer, almost exclusively pine family species, 13% hardwood, less than 1% edible tissue, and 17% nonwoody material. Edible tissue consists of at least one western goosefoot seed, and a trace of edible root. A small piece of curled fibrous tissue thought to have been processed material is the only botanical artifact from the zone. A trace of cypress family wood is found among the conifers; the family which comprised from 4% to 14% of all wood in earlier zones has all but disappeared.

Unit Level Materials

The samples from 3N64W, with an average carbon ratio of 0.02% and purity ratings not exceeding 4%, contributed little to the zonal assemblage weight. Undifferentiated Pinaceae wood, found in two lower level flotation samples, weighed 0.02 g. Traces of Douglas fir found in two samples, a trace of sage charcoal, and the processed bark found in one sample each complete the list. Ten to 40% of the weight of most subsamples consisted of lithic flakes, burnt bone, some shell and fish bone. Fish bone, for instance, was noted from UL 80, 100 and 110. The flotation sample from UL 110 (Flotation sample 89), incidentally, had no trace of carbon in any fraction. Apparently this unit was not situated near areas where fires were built.

Three unit level flotation samples from 0N64W were ten times as productive as other test unit levels. The carbon ratio averaged 0.2% while purity ratings ranged from 20% to 60%. Nonetheless, the assemblage is quite ordinary; as far as can be determined, all the material is locally available. Samples are composed of a little ponderosa pine and lodgepole pine in equal amounts, (0.02 g each), a little yellow pine, and a trace of Douglas fir in two of the flotation samples. Bitterbrush (0.01 g) appears in three samples. A trace of medium-sized bunchgrass occurs in one flotation sample along with a trace of herbaceous stem tissue, a piece of seed coat which may be bitterbrush, and a small amount of possible root tissue. The flotation sample contains an occasional bone fragment and there are floral and insect contaminants (including fresh chenopodium seeds). All in all, the unit level material from Zone 2 does not resemble that from previous zones. It seems much more like that of Zone 1 (below).

Feature Material

Features 122 and 126 are probably the same pit feature in Housepit 2. Only a small lens of light soil separated them. Viewed as one pit feature, Flotation sample 37 would represent the top, and Flotation sample 38, the bottom. Each produced about 0.04 g of charcoal and had carbon ratios of 0.02 and purity ratings of 50%. They also have the same ratios of conifer and hardwood: 75% and 25%, respectively. Each contains lodgepole pine, Douglas fir, and serviceberry or serviceberry/hawthorn charcoal. Flotation sample 37 has spruce charcoal, a piece of bark which is probably birch, and one charred western goosefoot seed (one more was in the heavy fraction). Flotation sample 38 yielded ponderosa instead of spruce, and a trace of cypress family wood. In short, the two assemblages resemble each other rather markedly. We suspect they are the consequence of the same general episode of burning. The non-floral contents--roots, a trace of insect, one lithic flake and some calcined bone--tell us little about the pit contents.

ZONE 1

The six unit level flotation samples from 3N64W yielded 0.13 g of charred material, nearly all of which was from the lower four levels of Zone 1. The carbon ratio averaged 0.04% and purity ratings varied from 1 to 9%. The zonal assemblage consists of 69% conifer (all pine family species), 7% hardwood, less than 1% edible tissue, and 24% other tissue. The edible material consists of a minimum of four charred and popped chenopodium seeds, two of which are probably C. fremontii. No members of the cypress family appear nor is there any sage or bitterbrush charcoal. The small amount of hardwood consists of serviceberry, serviceberry/hawthorn wood and other rosaceous hardwood.

The botanical peak in Zone 1 is found in Unit Level 60 with a carbon ratio of 0.1%. The subsample produced Douglas fir, larch, and yellow pine, pitch and herbaceous material. The pine is incompletely charred. It is also pitch or resin-coated in such a manner as to suggest an artificial coating. We have noted similarly pitch-coated pine from Housepit 3 of 45-OK-2. On both pieces, the coat lies in a uniform layer on the wood, covering the cells like black paint.

The subsamples from Levels 40 and 50 each contained two charred chenopodium seeds. The UL 40 chenopodium seeds are possibly charred and very fragile; their species has not been determined. One from UL 50 is charred and popped western goosefoot; the other is possibly charred, and cannot be positively identified as western goosefoot.

The seeds are found with ponderosa pine, Douglas fir and rosaceous charcoal (serviceberry in UL 50). Larch and a trace of herbaceous tissue accompanied the western goosefoot as well.

6. FEATURES ANALYSIS

During excavations at 45-OK-258, 175 features were identified in the field. Some of these represented natural strata and are not considered in feature analysis. Others were found to be redundant and combined, or inconsequential and discarded. The cultural features which remained were classified according to a two-tiered paradigmatic classification (described in Campbell 1984d) which considers, on the one level, feature boundaries, provenience, shape and patterning; and, on the second level, the abundance of material contents. By combining the information of the paradigmatic classes with information on size and actual material counts, we then classified the features into functional types. These functional types are broadly defined as housepits, firepits, other pits, exterior occupation surfaces, and debris scatters.

Formal feature analysis was begun and completed in the summer of 1983; excavations began at 45-OK-258 in the summer of 1978 and were completed in fall 1979. Our interpretations here are based on data recorded in unit level notes, daily site summaries, stratigraphic profiles and photographs. Our perspective is site-wide, unlike the excavators' perspective which was generally confined to the 2 x 2-m unit. Therefore, the interpretation of cultural features here may differ from preliminary reports. It should be apparent that our definition of cultural features is a conservative measure of site structure: nothing but field assigned features are considered. We lacked the time to reassess all excavation notes for unfeatured surfaces or concentrations. By no coincidence, most cultural features recorded in the field had very obvious boundaries or massive structural elements. .cp 3

Two cultural components have been identified at 45-OK-258. The first of these is a large Hudnut Phase housepit settlement dating from around 3500-2400 B.P.; the younger component is a second housepit occupation dating to the Coyote Creek Phase, around 800 B.P. to historic times. The cultural features of each component are discussed in detail below by analytic zone and area.

ANALYTIC ZONE 5

All areas of the site were occupied during the accumulation of Zone 5 deposits. At least one housepit, in Area 5, and possibly another housepit in Area 2, saw intensive activity during this time. In Area 3, the relatively low material density suggests occasional use of the surface. In addition, a large roasting pit and another pit of unknown function were recorded during

testing in Area 4. The Zone 5 salvage features and their contents are summarized in Tables 6-1, 6-2, 6-3.

AREA 2

The Zone 5 occupation in Area 2 followed closely on the occupation of Housepit 5, discussed below. Area 2 encompasses a rich, varied, and intensive cultural occupation. However, the nature and extent of this occupation is concealed by later occupations and construction in both Areas 2 and 5. It is possible that the surface recorded in Area 2, Zone 5 is a housepit floor, given the presence of postmolds and what could be a central hearth area (Figure 6-1). A wall-like feature can be seen in profile at the west side of Area 2, apparently truncating the Zone 5 occupation of Housepit 5. No other walls, however, were noted during excavation and so it is equally possible that Area 2, Zone 5 represents an exterior occupation surface. In contrast to Housepit 5, Area 2 has a much greater quantity of shell, especially in the firepit, and a greater proportion of jasper waste flakes. These differences may reflect outdoor-vs-indoor activity surfaces, or different seasons of use.

Tables 6-1, 6-2, and 6-3 give material counts for the general floor levels of Zone 5, Area 2 (Features 204, 134, 135, 141, 151). The same animal species are represented in the bone fragments as in other housepit floors at the site; densities of other material are comparable to those of other occupation surfaces. Shell density is slightly higher, reflecting the concentration of shell in the northwest corner of the area and the burned shell in the firepit.

Firepit 25-1 (F158) is circular and shallow, and saucer-shaped in cross section. Ten cm in diameter and 20 cm deep, it contains a milling stone and two large rocks, all modified by fire, as well as other, smaller FMR. Beneath the larger rocks is a 10 cm layer of ash and burned, crushed shell (some of this shell is recorded in the tables since only hinge pieces or pieces larger than 1/2" were recorded). Below the ash and shell was a second layer of oxidized, fire-hardened matrix. Lithic material was sparse--aside from the milling stone, only a drill, also burnt or heated, and four flakes were recovered. As with other fire pits, the bone fragments tend to be small ($\bar{x}$ =0.18 g) and the FMR larger ($\bar{x}$=501 g) than in surface scatters .

Four postmolds were recorded in Area 2, Zone 5. Two (Feature 159 and Feature 160) are so shallow they are little more than depressions in the occupation floor. Each is 20 cm across and extends 3 cm into the basal sterile deposits. It may be that these two, located just east and north of the firepit, actually originated higher up in the deposits but were not noted by excavators until they contrasted with the surrounding sand. A third posthole (Feature 155), 20 cm across and 28 cm deep, in the same unit as the first two yielded only seven small bone fragments. A small postmold (Feature 147), 20 cm across and 30 cm deep, was partially exposed in 1S34W, in association with a shell concentration nearly 60 cm across.

Table 6-1. Material recovered from features, Zone 5, 45-OK-258.

Feature by Area (Field number)	Debitage	Formed Objects	Bone		Shell		FMR	
			#	grams	#	grams	#	grams
Area 2								
Occupation Surface (F134,135,141,151,204)	361	22	11,084	2,498	2,161	3,705	310	34,704
Firepit 25-1 (F158)	4	2	93	17	82	27	24	12,035
Pit 25-1 (F147)	1	-	15	2	11	-	1	80
Area 3								
Feature 302	202	24	1,080	424	1,195	2,941	177	20,874
Stain (F54)	4	-	23	4	35	137	4	995
Area 5 (Housepit 5)								
Floor (F9,33,84, 121,144,50)	1,346	96	39,900	11,216	5,309	11,081	482	14,355
Firepit 55-1 (F123)	2	-	397	71	21	47	12	1,646
Firepit 55-2 (F85)	5	-	79	37	11	20	3	130
Bone Concentration 55-A (F24)	529	16	23,545	11,618	705	2,128	227	19,370
Bone Concentration 55-B (F157)	4	6	243	937	1	-	-	-
Bone Concentration 55-C (F106)	4	-	1,602	174	3	5	-	-
Rock Cache 55-D (F130)	4	3	28	4	-	-	-	-
Pit 55-1 (F161)	1	-	353	62	40	-	2	1,300
Pit 55-2 (F107)	3	3	138	182	14	49	2	90

Table 6-2. Identified bone from features, Zone 5, 45-OK-258.

Feature by Zone (Field number)	Deer	Deer-Sized	Elk-Sized	Cervidae	Mountain Sheep	Pronghorn Antelope	Sheep/Antelope	*Canis* spp.	Red Fox	Beaver	Marten	Salmonidae	Cyprinidae	Catostomidae	Frog	Salamander	Painted Turtle	Snake	Ground Squirrel	Pocket Gopher	Pocket Mouse	Deer Mouse	Other Mouse
Area 2																							
Occupation Surface (F134,135,141,151,204)	35	31	-	-	7	1	-	1	-	-	-	1	3	-	-	-	3	-	-	2	-	-	-
Firepit 25-1 (F158)	-	1	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-
Pit 25-1 (F147)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Area 3																							
Feature 302	12	26	-	-	-	-	1	3	3	1	4	1	3	-	1	-	-	2	-	13	2	-	1
Stain (F54)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Area 5 (Housepit 5)																							
Floor (F9,33,84,91,121, 144,501)	322	878	-	1	14	1	44	25	-	-	-	21	4	-	1	1	5	1	2	4	1	3	-
Firepit 55-1 (F123)	18	5	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Firepit 55-2 (F85)	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bone Concentration 55-A (F24)	246	194	-	2	41	-	-	-	-	-	-	-	-	-	-	-	7	-	-	-	-	-	-
Bone Concentration 55-B (F157)	51	109	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bone Concentration 55-C (F106)	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rock Cache 55-D (F130)	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pit 55-1 (F161)	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pit 55-2 (F107)	8	12	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 6-3. Formed objects from features, Zone 5, 45-OK-258.

Feature by Zone (Field number)	Utilized Only Flake	Unifacially Retouched Flake	Bifacially Retouched Flake	Biface	Projectile Point	Projectile Point Base	Projectile Point Tip	Drill	Graver	Scraper	Core	Tabular Knife	Hammerstone	Edge-Ground Cobble	Peripherally Flaked Cobble	Amorphously Flaked Cobble	Millingstone	Stone Bead	Shell Bead	Bone Wedge	Bone Bead	Flaked Long Bone	Indeterminate Bone/Antler	Indeterminate Stone
Ar a 2																								
Occupation Surface (F134,135,141,151,204)	1	1	1	1	-	1	1	1	-	-	2	3	-	-	1	-	-	-	1	-	-	2	2	-
Firepit 25-1 (F158)	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Pit 25-1 (F147)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Area 3																								
Feature 302	6	1	-	-	3	1	-	-	-	4	-	3	4	-	-	-	-	-	-	-	-	-	2	-
Stain (F54)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Area 5 (Housepit 5)																								
Floor (F9,33,84,91, 121,144,501)	13	-	-	2	4	-	4	-	-	4	1	15	3	1	-	-	2	3	3	1	4	3	25	8
Firepit 55-1 (F123)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Firepit 55-2 (F85)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bone Concentration 55-A (F24)	4	-	1	-	1	2	-	-	-	1	-	1	1	-	-	-	-	1	-	-	-	-	4	-
Bone Concentration 55-B (F157)	-	1	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	3	-
Bone Concentration 55-C (F106)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rock Cache 55-D (F130)	-	-	-	-	-	-	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	-	-
Pit 55-1 (F161)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pit 55-2 (F107)	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	1	-	-	-	-

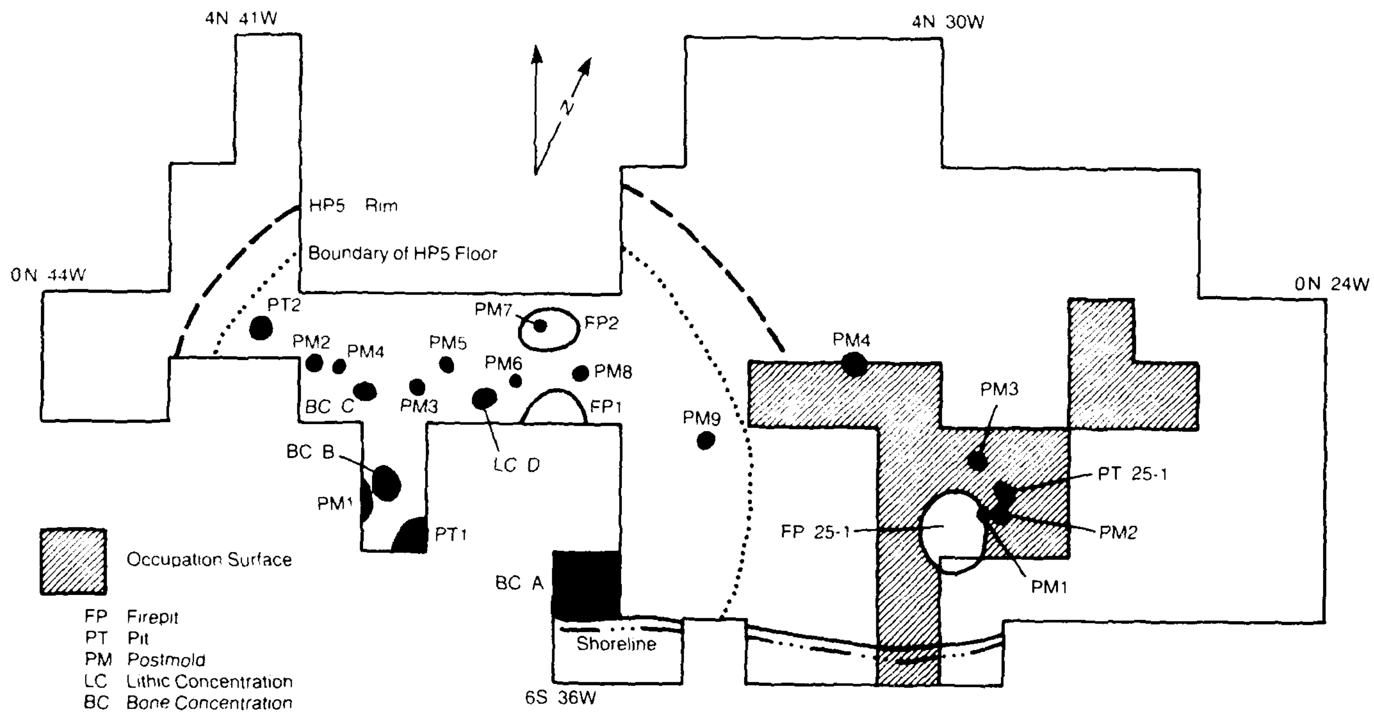

Figure 6-1. Location of features in Housepit 5 (Area 5) and Area 2, Zone 5, 45-OK-258.

AREA 3

Analytic Zone 5 in the Housepit 3 area (Area 3) comprises the stratum and features which predate the construction of Housepit 3. This consists of Feature 302, a stratum of fine-grained, yellow, sandy silt (now designated as Stratum 321) and small areas of darker matrix on its surface. Only one such stained area is featured separately here. While this stratum contains much cultural material, it lacks cultural features: this implies that although the area was used before the excavation of Housepit 3, use was not intensive.

A small area of intensely stained, black matrix was recorded on the surface of Feature 302. Excavators exposed only the northeast corner of the feature (Feature 54), which was 3-5 cm thick. The triangular portion exposed measured 60 by 50 cm. Its material density is quite high for a feature of this size in this context (i.e., part of a very lightly occupied stratum). Its location just south of the postulated entry ramp into Housepit 3 may indicate that this feature is related to the Zone 4 occupation of Housepit 3, even though its stratigraphic associations place it in Zone 5.

Outside the main housepit blocks, two other features are noted. These features were recorded during testing; radiocarbon dates indicate they fall into Zone 5. The oldest of these two features is a circular pit, approximately 1.5 cm in diameter (east and west margins not exposed) in 1N97W and 0N97W. Approximately 60 cm deep, this pit was thought in 1977 to be a housepit (and was designated Housepit 1), but excavation the following year proved otherwise. A radiocarbon date of 3054±232 B.P. (TX-2906) was obtained at the bottom of this pit. Field notes indicate that the material recovered from the pit was rather limited for a pit of this size. The fill contained pockets of ash and larger concentrations of carbon staining in an organically stained matrix.

The second pit, recorded in 3N64W, is a roasting pit dated to 2763±235 B.P. (TX-2905). This partially exposed feature (Testing Feature A) is oval in shape (90 x 68 cm) and basin-shaped in cross section (38 cm deep). While no FMR or formed objects were recovered from this feature, it did have interesting internal stratification. A dense layer of mussel shell covered the west half of the pit in the lower levels. The shells were often articulated and some appeared stacked inside each other. Bone debris, including antler fragments, was taken primarily from the upper levels. The botanical contents and structure of this earth oven are discussed in greater detail in Chapter 6.

HOUSEPIT 5 (AREA 5)

Housepit 5 was first occupied in Zone 5. The earliest of the housepit occupations uncovered at 45-OK-258, it has yielded dates of 2951±107 (TX-3386), 2878±216 (TX-3391), and 2787±103 (B-4302) B.P. These dates, and one instance of superposition of features, indicate that at least two floors are collapsed in Zone 5. It was not possible to distinguish these floors during

either excavation or analysis, although an even later floor in Housepit 5 was excavated separately and is assigned to Zone 4.

Housepit 5, Zone 5, and Housepit 3, Zone 4, contain the largest number of cultural features. The floor of Housepit 5 yielded two firepits, two other pits, several bone scatters, a rock pile or cache, and postmolds (Figure 6-1). It appears that several almost boulder-sized rocks were encountered during construction and left in place. Housepit 5 is nearly 9 m across and approximately 80 cm deep. Its shape cannot be determined because the southern rim has eroded away and the eastern rim was disturbed by occupation in Area 2. Its remaining walls are nearly vertical.

Tables 6-1, 6-2 and 6-3 list general floor material. Lithic debitage and bone counts seem especially high, but are compatible with multiple floors and intensive occupation. Housepit 3, Zone 4, exhibits the same pattern. Tool types and animal species identified are numerous and varied. Most of the identified bone was either deer or deer sized (Table 6-2), a large proportion of which (107 of the 1200 deer or deer-sized fragments) exhibit butchering marks. Among the 96 formed objects were a large number of beads (10), utilized flakes (13), and tabular knives (15) (Table 6-3). Most of the waste flakes are coarse quartzite (46%) with jasper and opal the next most common types. By noting the distribution of recorded cultural features, we can determine the probable location of special activity areas on the floor of Housepit 5.

The earlier of the two firepits in Housepit 5 (Firepit 55-1, Feature 123) yielded a radiocarbon date of 2787±103 B.P. (B-4302). It is a circular, shallow firepit, with a thick lens of ash, charcoal, burned bone and shell, and fired soil. About three-fourths exposed, the firepit is 140 by 120 cm, and 10 cm deep. As might be expected, the mean bone weight within the firepit was smaller ($\bar{x}$=0.18 g) than the mean bone weight for the floor as a whole ($\bar{x}$=0.28 g). The deer bones listed in Table 6-2 are all molar fragments; only one is burnt. Although 25 cm below the second firepit, it too overlies a diffuse layer of floor material, indicating a complex picture of several floors in Housepit 5.

Firepit 55-2 (Feature 85) is just north of, and above, Firepit 55-1. Also circular and shallow, it is sandwiched between two large rocks left _in situ_ in the housepit floor. Because it overlies an earlier postmold (F92), we date Firepit 55-2 to a middle floor in Housepit 5. Its fill contained dark charcoal staining, bone and shell fragments, and an area of burnt soil. Density of bone, shell, and FMR is half or less of material density in Firepit 55-1, and unlike other pits, the mean bone weight ($\bar{x}$=0.47 g) is larger than that of general floor levels. We may attribute this difference in density between the two firepits to the fact that Firepit 55-1 is partially filled by debris from later occupations, while Firepit 55-2, being near the top of Zone 5 deposits and separated from the Zone 4 occupations by relatively sterile aeolian deposits, received no extra debris.

Three major bone concentrations were recorded separately in the floor of Housepit 5. The first, Bone Concentration 55-A (Feature 24), yielded the earliest housepit date of 2951±107 B.P. (TX-3386). It is unique in many ways.

First, the quantity of bone is enormous: over 23,500 bone fragments recovered in a 0.5 m^3 area. The mean bone weight of 0.49 g is half again as much as that for general floor levels, although pockets of crushed bone occurred among the larger bone. A second unique trait is the prevalence of jasper and evidence of heat treatment among the debitage. In all other Housepit 5 features and the floor, heat treatment of lithics is rare and coarse quartzite by far the most numerous material type. The prevalence of jasper and the association of Bone Concentration 55-A with the Area 2, Zone 5, occupation surface (see above) raises the possibility that this bone concentration results from dumping of debris from Area 2 into the Housepit 5 depression. Confined to the southeastern corner of the housepit and 20-30 cm thick, the bone concentration closely follows the slope of the floor and walls. It occurs in a lighter colored matrix directly below a dark cultural layer. This dark layer is thought to be the Zone 5 occupation of Area 2, intruding into and disturbing the rim of Housepit 5 in this vicinity. Thus it would appear that the Housepit 5, Zone 5, occupation precedes the Zone 5 occupations in Area 2.

Bone Concentration 55-B (Feature 157) occurs on the west side of the Housepit 5 floor. This feature includes all objects, primarily of bone, which were found in situ during the excavation of a single 1 x 2 x 0.10 m level (all matrix and screened material were collected as "unit level"). This method of recording explains the extremely large size of bone recovered ($\bar{x}$=3.8 g). The quantity of very large bone, however, was the reason why this unit level was originally featured. This bone concentration represents a unique activity in this area of the housepit floor, but gives no clues about the nature of that activity. It is located between Postmolds 55-1 and Pit 55-1.

The last bone concentration, Bone Cencentration 55-C (Feature 106), lies just north of the second. It is a very small, shallow (5 cm), extremely dense concentration of pulverized bone. Associated with this concentration is an anvil stone, apparently used in the bone processing. This confined activity area is located between Postmolds 55-3 and 55-4.

A fourth concentration recorded on the floor of Housepit 5 (Feature 130) is a concentration of tightly packed rocks, two of which are fire-modified. Two hammerstones and a peripherally flaked cobble were among this material, cached near a possible anvil stone.

Two pits were recorded in the floor of Housepit 5. Pit 55-1 (Feature 161) had been partially eroded away. The remaining one-third indicated a circular pit, 60 cm in diameter, and 24 cm deep. Its fill is similar to the floor matrix above it, although as with most pits, bone is slightly smaller and more frequent, while FMR are fewer and larger. Pit 55-1 seems to have been used as a refuse pit. Pit 55-2 (Feature 107) reverses the trend seen in other housepit floor features. Smaller than Pit 55-1, it measures 50 x 40 x 10 cm. Its fill is darker than the surrounding floor matrix and, suprisingly, mean bone weight ($\bar{x}$=1.32 g) is four times that of bone from the floor at large. Several of the identified bones carry butchering marks (one is an antler wedge), suggesting that Pit 55-2 contains refuse from butchering activities in this section of the housepit floor.

Nine postmolds were recorded in the floor of Housepit 5. Table 6-4 lists their dimensions and contents. Not all of the postholes originate from the same floor. For instance, Postmold 55-7 (Feature 92) lay below Firepit 55-2, in one of the lower floors of Housepit 5. Postmold 55-2 (Feature 109), on the other hand, is in the same unit as Postmolds 55-3 and 55-4, but was discovered at a higher excavation level, indicating that it originates in the middle floor. Postmold 55-9 (Feature 119) originates just below Pit 54-1 (Zone 4) suggesting that it too originates in the middle floor. The others are of uncertain provenience. Several postmolds contain large FMR which apparently provided a stable footing for the posts in the underlying sand. Two (Postmolds 55-5 and 55-6) contain burned remnants of posts. The nine postmolds form an arcing pattern around the center of the housepit. A circular alignment of smaller posts is suggested.

In sum, Housepit 5 is a round to oval straight-walled housepit of medium depth (80 cm). The distribution of bone concentrations, pits, and a pile or cache of stone tools suggest activity areas on the floor. The arrangement of the nine postmolds suggests a circular support system of 20 cm beams. Two firepits, from two different floors, were also recorded. We have dated this housepit to around 2850 B.P.

ANALYTIC ZONE 4

During Zone 4, two housepits were occupied and several outdoor surfaces were utilized for a variety of activities. The two housepits may have been occupied contemporaneously, but it seems unlikely. While the radiocarbon date obtained from Housepit 5 is bracketed by the two radiocarbon dates from Housepit 3, the three dates span nearly five hundred years. The features recorded in Zone 4 and their contents are summarized in Tables 6-5, 6-6, 6-7.

AREA 2

Area 2 saw continued use in Zone 4. No structural features, however, were recorded and artifact densities, especially of formed objects, are significantly lower. We find this decrease surprising given our assumption that Zone 24 represents the exterior occupation surface contemporaneous with the later occupation in Housepit 5. It may be, however, that later occupation and housepit construction have destroyed associations between Housepit 5 and Areas 2. Backdirt thrown into the Housepit 5 depression from an Area 2 occupation may be evidence for this. The backdirt lies between the Zone 5 and Zone 4 occupations of Housepit 5 and may result from pithouse construction in Area 2, Zone 5. More backdirt, apparently from the cleaning of Housepit 5 during Zone 4, was re-deposited into Area 2 on top of the Zone 5 occupation.

Table 6-4. Postmold dimensions and contents by zone, 45-OK-258.

Feature by Zone (Field number)	Diameter x Depth (cm)	Debitage	Formed Objects	Bone		Shell		FMR	
				#	wt (g)	#	wt (g)	#	wt (g)
ZONE 5									
Housepit 5									
1 (F156)	25x29	3	-	61	30	1	-	1	320
2 (F109)	17x15	-	-	35	8	1	6	1	19
3 (F116)	20x20	-	-	26	7	5	5	4	1,620
4 (F117)	20x20	3	-	21	3	2	11	-	-
5 (F129)	15x14	-	-	5	-	1	2	4	1,317
6 (Fill)	23x17	-	-	232	37	27	105	8	746
7 (F92)	20x10	-	-	-	-	-	-	-	-
8 (F124)	12x 7	-	-	4	-	-	-	-	-
9 (F119)	23x13	7	-	129	44	4	15	2	344
Area 2									
1 (F160)	15x 3	-	-	-	-	-	-	-	-
2 (F159)	15x 3	-	-	-	-	-	-	-	-
3 (F155)	20x28	-	-	7	1	-	-	-	-
4 (F147)	20x30	1	-	15	2	11	-	1	80
ZONE 4									
Housepit 5									
1 (F128)	20x20	-	-	4	1	2	1	6	4,948
Housepit 3									
1 (F39)	25x23	-	-	113	25	6	27	-	-
2 (F35)	20x18	4	-	68	46	-	-	-	-
3 (F44)	30x15	-	-	28	5	-	-	-	-
4 (F43)	20x39	-	-	35	12	3	8	-	-
5 (F75)	15x20	-	-	29	11	-	-	-	-
6 (F79)	20x25x24	-	-	21	16	1	1	1	30
7 (F103)	35x14	-	-	1	2	-	-	6	5,020
8 (F99)	25x30x45	-	1(PFC)	13	14	-	-	-	-
9 (F98)	20x45	-	-	4	1	-	-	-	-
10*	20x 3	-	-	-	-	-	-	-	-
11*	22x 6	-	-	-	-	-	-	-	-
ZONE 3									
Area 3 Clay Layer*									
5N52W									
1	3x 2	-	-	-	-	-	-	-	-
2	5x 4	-	-	-	-	-	-	-	-
3	3x 2	-	-	-	-	-	-	-	-
4	5x 4	-	-	-	-	-	-	-	-
5	4x 2.5	-	-	-	-	-	-	-	-
6	4x 1.5	-	-	-	-	-	-	-	-
7	3x 2.5	-	-	-	-	-	-	-	-
8	4x 4.5	-	-	-	-	-	-	-	-
5N51W									
9	7.5x 6	-	-	-	-	-	-	-	-
10	3x 3	-	-	-	-	-	-	-	-
11	4x 4	-	-	-	-	-	-	-	-
12	5x 4	-	-	-	-	-	-	-	-
6N49W									
13	8x 3	-	-	-	-	-	-	-	-
14	8x 6.5	-	-	-	-	-	-	-	-

* Not recorded as features, no material counts available.

Table 6-5. Material recovered from features, Zone 4, 45-OK-258.

Feature by Area (Field number)	Debitage	Formed Objects	Bone		Shell		FMR	
			#	grams	#	grams	#	grams
Area 2								
Occupation Surface (F203)	244	12	1,137	495	547	657	104	16,573
Area 3 (Housepit 3)								
Floor (F45,46,71,87,95, 97,102,104,105,301)	1,719	132	26,389	7,485	1,079	3,590	622	125,729
Hearth Area (F25,26,31, 47,73)	102	12	3,480	800	468	1,055	143	50,930
Pit 34-1 (F41)	-	1	4	1	-	2	-	-
Pit 34-2 (F38)	4	1	192	198	9	3	6	4,700
Pit 34-3 (F42)	6	2	123	50	10	24	1	110
Pit 34-4 (F48)	2	-	23	7	-	-	-	-
Pit 34-5 (F16)	16	3	209	176	9	38	-	-
Pit 34-6 (F27)	7	1	195	31	-	-	1	150
Pit 34-7 (F19)	29	7	2,562	1,129	36	161	18	3,205
Pit 34-8 (F96)	3	1	83	62	15	83	4	490
Area 4								
Occupation Surface (F7)	169	15	8,106	2,709	8	30	67	4,110
Area 5 (Housepit 5)								
Floor (F82,101,500)	831	55	15,701	2,963	6,624	11,937	329	41,313
Pit 54-1 (F112)	5	-	344	88	7	14	1	170
Pit 54-2 (F89/108/110)	31	7	631	131	158	275	8	665
Area 6								
FMR Scatter (F3)	70	8	2,886	684	4	11	57	16,820

Table 6-6. Identified bone from features, Zone 4, 45-OK-258.

Feature by Area (Field number)	Deer	Deer-Sized	Elk-Sized	Cervidae	Mountain Sheep	Pronghorn Antelope	Sheep/Antelope	Wolf	Coyote	*Canis* spp.	Bear	Jackrabbit	Weasel	Marten	Salmonidae	Cyprinidae	Frog	Salamander	Painted Turtle	Snake	Pocket Gopher	Pocket Mouse	Deer Mouse
Area 2																							
Occupation Surface (F203)	14	22	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	8	3	2
Area 3 (Housepit 3)																							
Floor (F45,46,71,87, 95,104,301)	121	157	2	1	23	2	3	1	1	3	-	1	1	-	3	1	-	-	3	1	-	-	-
Hearth Area (F73, F31, etc.)	19	22	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	8	-	-	-	-
Pit 34-1 (F41)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pit 34-2 (F38)	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pit 34-3 (F42)	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pit 34-4 (F48)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pit 34-5 (F16)	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pit 34-6 (F27)	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pit 34-7 (F19)	35	36	-	-	2	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Pit 34-8 (F96)	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Area 4																							
Occupation Surface (F7)	91	40	1	-	6	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-
Area 5 (Housepit 5)																							
Floor (F82,101,500)	98	144	-	-	27	1	4	-	-	1	1	-	-	3	14	2	4	3	2	-	5	-	-
Pit 54-1 (F112)	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pit 54-2 (F89/108/110)	3	19	-	-	1	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Area 6																							
FMR Scatter (F3)	10	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-

Table 6-7. Formed objects from features, Zone 4, 45-OK-258.

Feature by Area (Field number)	Utilized Only Flake	Unifacially Retouched Flake	Bifacially Retouched Flake	Resharpening Flake	Biface	Projectile Point	Projectile Point Base	Projectile Point Tip	Linear Flake	Drill	Graver	Scraper	Core	Tabular Knife	Hammerstone	Chopper	Peripherally Flaked Cobble	Millingstone	Stone Bead	Shell Bead	Awl	Flaked Long Bone	Indeterminate Bone/Antler	Indeterminate Stone	Indeterminate Other
Area 2																									
Occupation Surface (F203)	5	-	-	-	-	-	-	-	-	-	-	-	2	1	1	1	-	-	-	-	-	-	2	-	-
Area 3 (Housepit 3)																									
Floor (F45,46,71,87,95, 104,301)	12	4	2	1	6	7	-	2	3	2	1	4	3	31	7	4	3	4	3	-	1	-	18	11	3
Hearth Area (F73, F31, etc.)	1	1	2	-	2	-	1	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	3	-	-
Pit 34-1 (F41)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Pit 34-2 (F38)	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Pit 34-3 (F42)	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pit 34-4 (F48)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pit 34-5 (F16)	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Pit 34-6 (F27)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Pit 34-7 (F19)	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	-	-	-	-	-	-	-	1	-	-
Pit 34-8 (F96)	-	-	-		-	-	-		-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Area 4																									
Occupation Surface (F7)	1	-	-	1	-	1	2	-	3	-	-	-	-	2	-	1	-	-	-	-	-	-	3	1	-
Area 5 (Housepit 5)																									
Floor (F82,101,500)	10	2	1	-	5	3	2	2	-	-	2	3	2	4	1	-	-	-	-	2	-	1	8	7	-
Pit 54-1 (F112)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pit 54-2 (F89/108/110)	-	1	-	-	-	-	-	-	-	-	-	-	-	2	1	1	-		-	1	-	-	1	-	-
Area 6																									
FMR Scatter (F3)	-	-	1	-	1	1	-	1	2	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-

AREA 3

Housepit 3 is an oval housepit, measuring 7.5 m (N-S) by approximately 9.5 m. In profile, it is basin-shaped with moderately sloping walls, dug 130 cm down through a stratum of yellow sand. Floor deposits cover an 8.3 x 7 (N-S) m area, following the walls upwards for a few centimeters, except along the southern rim where they do not approach the housepit edge. In fact, material is conspicuously absent from a rectangular area in this section (Figure 6-2), perhaps indicating an entryway. The continued reuse of Housepit 3 makes this absence of material all the more marked. At least two, if not more, floors are included in the material counts given in Table 6-5, and radiocarbon dates of 2324±125 B.P. (TX-3385) and 2851±103 B.P. (B-4299) indicate use over a period of several hundred years.

Figure 6-2 shows the distribution of cultural features in the floor of Housepit 3, while Figure 6-3 shows concentrations of material types. Again, we note the complete lack of features or debris in the area of the postulated southern entry ramp. We may also postulate other special activity areas. A semi-circular stain of blackened soil (4N50W, Feature 95) contained a few tiny bone fragments. Because it held no evidence of <u>in situ</u> burning, this 30 cm diameter area may be the refuse from either a trash pit or a roasting pit which was dumped or accumulated in a low spot on the floor. A second similar stain (Feature 87), also marked by small bone fragments, occurs just north of the first. A pile of 34 fire-modified rocks (Feature 45), one meter to the east of these two floor stains, may also be associated. All three features may be associated with Pit 34-6 (Feature 27), a shallow pit containing a large milling stone, which lies just east of the two stained areas and just south of the pile of FMR. It too was characterized by many tiny bone fragments $\bar{x}$ = 0.16 g), burnt soil, and concentrated charcoal. It may have once been the firepit or roasting pit from which the other features were taken. This constellation of four features appears to date to the second, younger floor, since the two postholes in the same area originate in lower levels.

Three concentrations of debris on the housepit floor were given separate feature numbers in the field. The first is a small (25 x 20 x 5 cm) concentration of bone fragments (Feature 71). The mean weight of these fragments ($\bar{x}$=1.76 g) is much greater than for the floor as a whole ($\bar{x}$=0.28 g) suggesting that a special type of meat processing occurred here. In contrast, very tiny fragments ($\bar{x}$=0.15 g) were found mixed with shell in a comparable area on the north side of the housepit (Feature 46). The number of fragments recovered from this area suggests they were disposed of here, and do not result from a single primary activity such as butchering or marrow extraction. Finally, four tabular quartzite rocks were found cached (?) beneath the floor in 4N51W (Feature 104). They show no signs of use or manufacture.

Several concentrations on the floor of Housepit 3 were not featured (Figure 6-3). Aside from the shell and bone concentration in 7N49W (Feature 46), shell is also concentrated in 2N51W, but scattered widely elsewhere. Again, these concentrations may have resulted either from dumping or localized processing or both. A concentration of waste flakes, recorded on the western

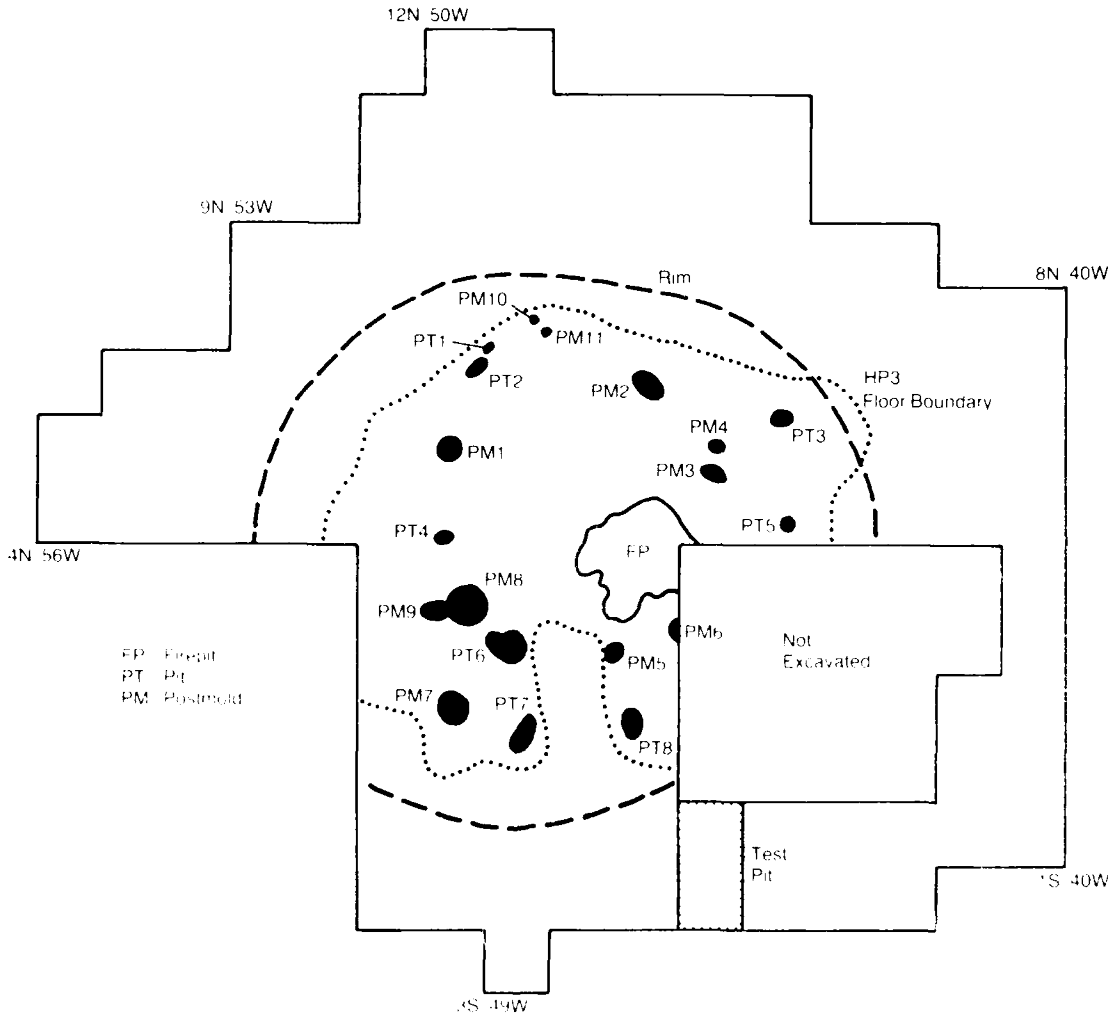

Figure 6-2. Location of features in Housepit 3 (Area 3), Zone 4, 45-OK-258.

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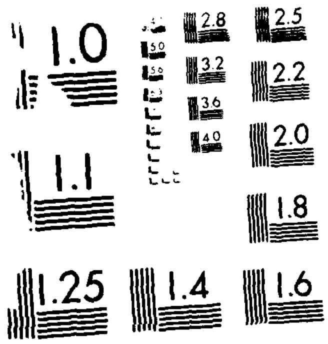

MICROCOPY RESOLUTION TEST CHART

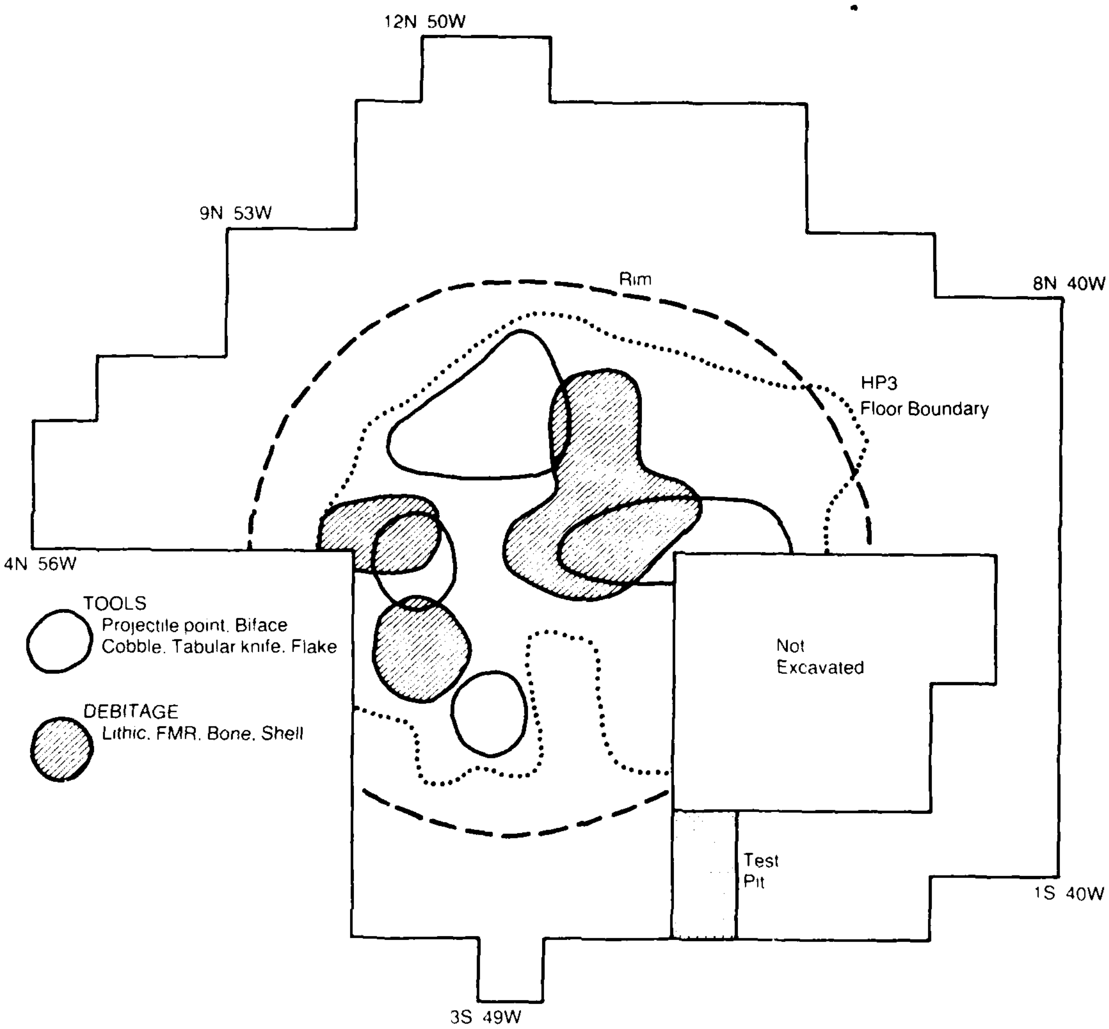

Figure 6-3. Artifact concentrations in the Housepit 3 floor (Area 3), Zone 4, 45-OK-258.

edge of the housepit floor, may indicate a knapping station. Charcoal staining and ash are confined to the central firepit area and the northwest corner of the housepit, while FMR occur south of the 5N line almost exclusively. Bone is more evenly distributed, but follows a pattern similar to that noted for charcoal.

Except for structured features or unusual distributions, the floor in Housepit 3 was collected as Feature 301. Materials from unstructured features and debris concentrations are tabulated with the general floor materials in Tables 6-5, 6-6, and 6-7. At least two floors have been lumped together, somewhat obscuring spatial relationships. While sterile sand was noted between the floors in some units, such was not the case in most, and all floor material was excavated as a single feature in all units. Even so, some basic patterns can be noted among the structural features associated with the floor in addition to the patterns noted above among non-structural features.

A large area of intensely blackened soil, ash, orange sand, FMR, and charcoal can be found just off-center in the housepit. Apparently, a central firepit was located in this same area throughout the span of pithouse occupation. Table 6-5 lists the material recovered from this area, which was approximately 4 m^2 and 20 cm thick. Compared with material taken from general floor levels, the bone tends to be slightly smaller, and the FMR much larger. As would be expected, a greater proportion of lithics and bone are burned among the hearth area materials. No obvious, structured firepit remains, however.

Pits are a second type of structural feature occurring within the housepit. Eight pits are recorded within Housepit 3. Their functions vary, as do their contents, from trash pits filled with general debris to bone processing pits. Contents of the pits are listed in Tables 6-5, 6-6, and 6-7.

Three pits are thought to be large postmolds. Pits 34-2, 34-3, and 34-5 are straight-sided pits which may have contained large support posts. The very large rocks in the bottom of Pit 34-2 may have provided footing for such a post. Apparently, the larger posts were removed and, during subsequent occupations, the postmolds filled with occupation debris or were used as trash pits. These three pits, and Postmolds 34-1 and 34-7, if they did hold the major posts of the superstructure, suggest a circular support system. Smaller supports are indicated by the presence of other post molds.

We have previously discussed Pit 34-6 (Feature 27), a large, shallow pit, containing a large mortar or milling stone and numerous small bone fragments. It may have been a firepit or roasting pit associated with the upper floor. The milling stone may have been used to crush bone into the fragments which form most of the pit's fill. A mandible fragment and two premolars were identifed as deer.

Two other pits are similar to Pit 34-6 in form and content, and possibly, function. Pit 34-7 (Feature 19), to the west of the entryway, was "capped" by a large rock. It contained over 2500 bone fragments, some of which were identified: mountain sheep (2) including a horn core fragment), deer (35), deer size (36) and cyprinid fish (1). Three hammerstones, a tabular knife, and a bone tool were also taken from this pit. A stain in the fill was

apparently organic rather than the consequence of burning. Except that its rock shows no signs of wear, this pit is very similar in configuration to Pit 34-6. Pit 34-8 (Feature 96), on the other side of the entry, held fewer bone fragments and debitage, but also some shell, FMR, and a chopper. It too was partly covered by a large rock which, however, did not show any signs of wear.

Eleven postmolds approximately 20 cm in diameter were recorded. Table 6-4 shows the dimensions and contents. The postmolds form a circle around the central hearth area. Even though the postmolds do not all originate in the same floor, the circular alignment appears to have been consistent through time.

Several large boulders, apparently left undisturbed during the excavation of the housepit, mark its floor. As can be seen in Figures 6-1 and 6-2, the floor is uneven both in outline and surface; excavators noted numerous depressions of varying size. The material remains suggest a number of activities: shell processing, meat processing (including perhaps marrow extraction), tool repair and manufacture, and cooking. While excavators did not identify any sleeping areas, these may have been located on the housepit's northeast side where less material was encountered.

AREA 4

A dense scatter of broken artiodactyl bones, waste flakes and FMR (Feature 7) was recorded in 8N70W, Area 4, Zone 4. Excavators noted carbon-stained soil and charcoal flecks underlying the bone, and so we suspect the scatter is associated with an occupation surface. Fish, mountain sheep, and deer bone were identified (Table 6-6). A variety of tools was recovered as well (Table 6-7). Primarily coarse, heavy tools and utilized flakes, these may well be butchering tools. They are multipurpose objects, however, and such tools are often found in other contexts. This activity surface has been dated to 2925±103 B.P. (B-4298).

HOUSEPIT 5 (AREA 5)

Housepit 5 was the focus of a second, major occupation during the accumulation of Zone 4 deposits. In Housepit 5, this zone is dated to 2565±145 B.P. (B-4303), two to four hundred years after the initial occupation of Housepit 5 in Zone 5, and only one hundred years before Zone 3 occupation.

During Zone 4 occupation, the inhabitants apparently modified and re-excavated the original housepit depression. While in some units only a single housepit is apparent, other profiles suggest two pits, or two distinct episodes of construction, relating to the lower and upper occupations. In other units, however, only a single pit is evident. Backdirt from this area thrown onto the Zone 5 occupation surface of Area 2 provides further evidence that the occupants re-excavated Housepit 5.

Table 6-5 shows the material collected from the housepit floor (Features 500, 101, and 82) in this zone. Feature 82 is a diffuse area of butchered bone and many tiny fish bone on the floor of Housepit 5. Four of the 35

identified bone from this feature showed signs of butchering, including the single marten bone. The excavators' notes indicate that many of the unidentified bone bore butchering marks as well. The botanical remains and other fine-screen materials, such as fishbone, that characterize this feature are discussed in greater detail in Chapter 6.

The Zone 4 occupation of Housepit 5 appears to have been light when compared with the occupation in Zone 5, and the occupation of Housepit 3. This is perhaps due to the fact that several floors are represented by Zone 5, Housepit 5, and Zone 4, Housepit 3; whereas Zone 4, Housepit 5, probably only represents one or two floors. Its deposits were from 15 to 40 cm thick, and included a wide variety of formed tools and bone from several animal species. Unlike levels above and below, the debitage was mainly of opal.

Two pits were recorded in Zone 54 (Figure 6-4). The first, Pit 54-1, is an oblong (40 x 50 cm), shallow (10 cm) pit, containing little other than bone. The fill was a light colored clay and gravel matrix. The second pit, Pit 54-2, 120 cm in diameter and 35 cm deep, is much larger and more complex. This stratified pit contained a lower fill of dark by stained soil capped by a light sandy fill. Because none of the bones were burnt, we assume that it was not used for cooking or for a firepit; rather, the diversity and amount of recovered material suggest it is a trash pit.

Excavators recorded a possible postmold in 0N38W (F128). They recovered very little material from the 20 cm-diameter postmold (20 cm deep); they recorded no other postmolds in this zone. Six very large FMR that lay around the bottom of the postmold may have propped or braced the original post.

AREA 6

A concentration of bone and FMR (Feature 3) was uncovered in the west half of unit 14N64W. The FMR were concentrated in a 120 by 79 cm oblong area, while bone was also scattered to the south and east. Fist-sized lumps of charcoal were associated with the FMR concentrations, but there was no evidence of a firepit. It appears, instead, that the FMR and the bone are part of a larger occupation surface, approximately 8 cm thick. Most of the material from this stratum was collected as unit level and not as part of Feature 3. A radiocarbon sample from unit level material was dated to 3311±81 B.P. (B-4297).

ANALYTIC ZONE 3

Features recorded in Zone 3 and their contents are summarized in Tables 6-8, 6-9, and 6-10. None of the major excavated housepit depressions were the site of housepit occupations during Zone 3. Instead, they were the site of continued and still intensive, outdoor activities. However, Analytic Zone 3 does contain Housepit 4, a buried housepit exposed in the cutbank west of the major housepit concentration.

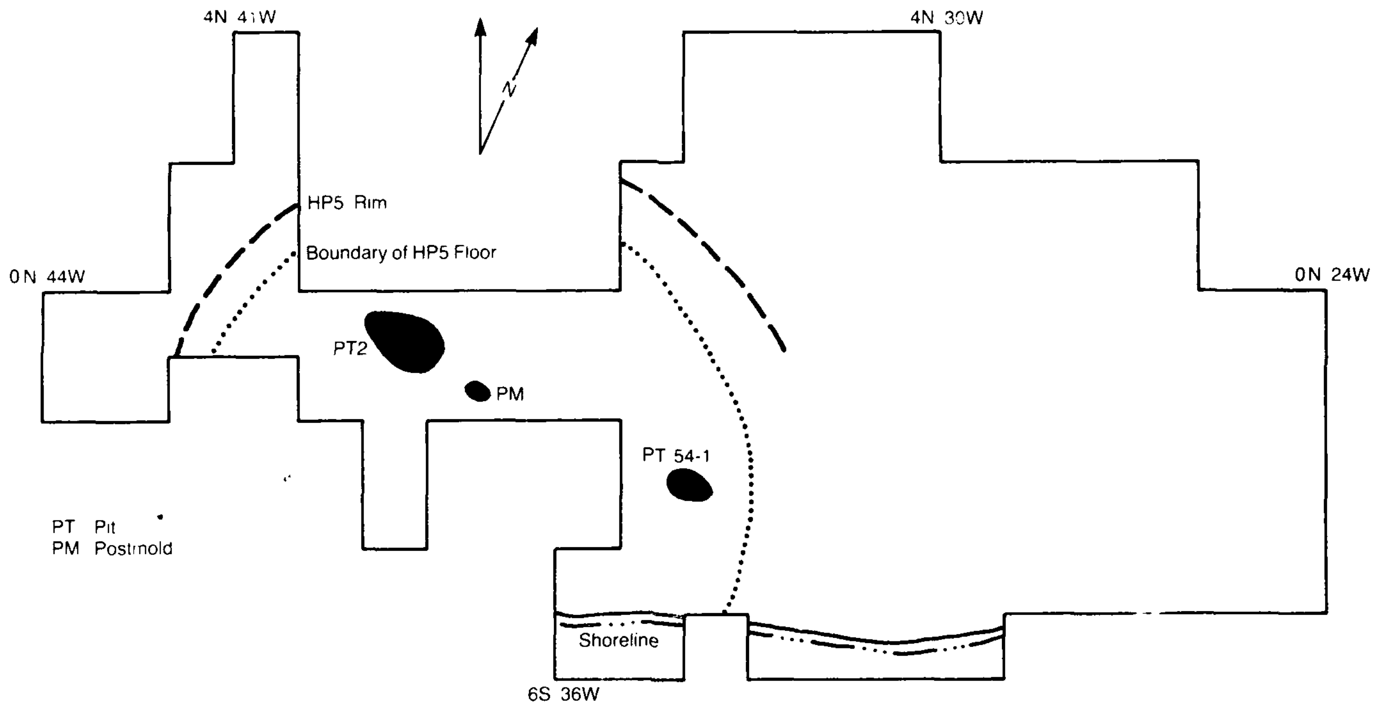

Figure 6-4. Features in Housepit 5 (Area 5), Zone 4, 45-OK-258.

Table 6-8. Material recovered from features, Zone 3, 45-OK-258.

Feature by Area (Field number)	Debitage	Formed Objects	Bone		Shell		FMR	
			#	grams	#	grams	#	grams
Area 2								
Occupation Surface (F202)	351	23	2,654	865	120	511	283	44,102
Pit 23-1 (F154)	18	1	166	34	7	21	12	2,557
Pit 23-2 (F150)	8	-	60	9	1	2	2	106
Area 3								
Pit 33-1 (F10)	9	-	73	8	56	139	1	280
Occupation Surface 33-A (F72, F69)	254	8	379	100	486	1,120	67	6,230
Bone Concentration 33-B (F83)	57	4	179	56	59	97	74	5,423
Postmold Layer (F15, F29)	7	-	56	20	1	1	-	-
Firepit 33-2 (F14)	18	1	117	41	49	142	54	36,335
FMR Scatter 33-C (F63)	-	1	5	9	-	-	47	14,640
Pit 33-3 (F37)	1	1	109	262	4	23	16	2,045
Shell Concentration 33-D (F132)	42	10	506	-	3,006	-	40	5,753
Shell Concentration 33-E (F70)	20	1	34	60	85	191	33	2,210
Area 4 (Housepit 4)								
Floor and Fill (F400)	84	11	1,944	480	172	491	45	5,378
Bone Concentration (F13)	126	19	2,821	1,778	60	148	16	2,440
Pit 43-1 (F28)	6	1	257	506	12	40	1	270
Pit 43-2 (F50)	22	7	552	95	51	101	2	405
Pit 43-3 (F51)	6	2	147	43	12	41	10	1,835
Area 4								
Dog Burial	10	1	190	35	1	1	-	-
Area 5								
Occupation Surface (F65, F68)	606	14	18,570	4,026	1,050	1,911	155	20,255
Occupation Surface (F143,146,149)	45	9	1,011	335	43	-	98	12,741
Bone Concentration (F88)	26	7	824	371	37	81	19	2,124
Area 6								
Firepit 63-1 (F2)	19	1	38	10	-	-	5	2,438
Firepit 63-2 (F1)	49	3	74	10	142	305	3	1,103

Table 6-9. Identified bone from features, Zone 3, 45-OK-258.

Feature by Area (Field number)	Deer	Deer-Sized	Elk	Elk-Sized	Cervidae	Mountain Sheep	Pronghorn Antelope	Sheep/Antelope	Dog	Canis spp.	Red Fox	Beaver	Salmonidae	Cyprinidae	Salamander	Painted Turtle	Snake	Pocket Gopher	Pocket Mouse	Deer Mouse	Other Mouse
Area 2																					
Occupation Surface (F202)	23	76	-	-	-	-	-	-	-	-	-	1	-	2	-	-	-	2	6	-	-
Pit 23-1 (F154)	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Pit 23-2 (F150)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Area 3																					
Pit 33-1 (F10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Surface 33-A (F72, F69)	5	4	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1
Bone Concentration 33-B (F83)	1	2	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Postmold Layer (F15,29)	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Firepit 33-2 (F14)	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FMR Scatter 33-C (F63)	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pit 33-3 (F37)	-	7	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shell Concentration 33-D (F132)	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shell Concentration 33-E (F70)	2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Area 4 (Housepit 4)																					
Floor and Fill (F400)	2	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	5	-	-
Bone Concentration 43-A (F13)	66	110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31	2	-	1	-
Pit 43-1 (F28)	12	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pit 43-2 (F50)	6	5	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	1
Pit 43-3 (F51)	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Area 4																					
Dog Burial	-	-	-	-	-	-	-	-	95	-	-	-	-	5	-	-	-	-	-	-	-
Area 5																					
Occupation Surface (F65, F68)	191	222	-	1	-	-	-	1	-	1	-	-	3	1	71	8	-	-	3	-	1
Occupation Surface (F143,146,149)	7	29	9	-	45	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
Bone Concentration (F88)	9	38	-	-	-	-	1	-	-	-	-	-	3	-	-	-	-	-	1	-	-
Area 6																					
Firepit 63-1 (F2)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Firepit 63-2 (F1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 6-10. Formed objects from features, Zone 3, 45-OK-258.

Feature by Area (Field number)	Utilized Only Flake	Unifacially Retouched Flake	Bifacially Retouched Flake	Biface	Projectile Point	Projectile Point Base	Projectile Point Tip	Linear Flake	Drill	Graver	Scraper	Tabular Knife	Hammerstone	Chopper	Millingstone	Hopper Mortar Base/Anvil	Bone Bead	Bone Pendant	Flaked Long Bone	Indeterminate Bone/Antler	Indeterminate Stone
Area 2																					
Occupation Surface (F202)	9	1	1	4	-	2	-	-	1	-	-	1	-	1	1	-	-	-	-	2	-
Pit 23-1 (F154)	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pit 23-2 (F150)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Area 3																					
Pit 33-1 (F10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Occupation Surface 33-A (F72, F69)	1	-	2	-	-	1	-	-	1	-	1	1	1	-	-	-	-	-	-	-	-
Bone Concentration 33-B (F83)	-	2	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Postmold Layer (F15, F29)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Firepit 33-2 (F14)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FMR Scatter 33-C (F63)	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Pit 33-3 (F37)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Shell Concentration 33-D (F132)	3	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	1	3
Shell Concentration 33-E (F70)	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Area 4 (Housepit 4)																					
Floor and Fill (F400)	3	-	2	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	4	-
Bone Concentration (F13)	2	3	-	1	1	-	1	1	-	1	-	4	1	-	-	-	-	1	-	3	-
Pit 43-1 (F28)	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Pit 43-2 (F50)	-	-	1	-	1	2	-	-	-	-	-	1	1	-	-	-	-	-	-	1	-
Pit 43-3 (F51)	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Area 4																					
Dog Burial	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Area 5																					
Occupation Surface (F65, F68)	3	1	1	1	-	-	1	2	-	-	-	-	-	-	-	-	1	-	-	4	-
Occupation Surface (F143,146,149)	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	1	4	-
Bone Concentration (F88)	2	-	1	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	2	-
Area 6																					
Firepit 63-1 (F2)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Firepit 63-2 (F1)	1	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-

AREA 2

Area 2, Zone 3, is distinguished by an occupation surface coeval in age to the Zone 3 occupations in Areas 3 and 5, although it has not been linked to them stratigraphically. Excavators recorded two pit features within this occupation. Pit 23-1 (Feature 154), in 2S30W is 25 cm in diameter and 26 cm deep. Though its fill contained no charcoal or carbon staining, it was dark brown. Excavators recovered small bone fragments from the fill, as well as several FMR from both the fill and the surface adjacent to the pit. Pit 23-2 (Feature 150), one-third of which was exposed, is a much larger pit, perhaps 90 cm in diameter. Again, the pit fill was very dark but showed no signs of firing. Its very small bone fragments average less than half the weight of occupation surface bone ($\bar{x}$=0.15 g vs. $\bar{x}$=0.33 g).

AREA 3

Although Housepit 4 was occupied during this period, the most intensive occupation--or, at least, the most complex record of occupation--occurs in Area 3. Here, in the fill above Housepit 3, several pits, occupation surfaces, and debris concentrations succeed one another. Zone 3 deposits extend beyond the housepit rim as well, with shell concentrations and pits recorded on the housepit periphery. The presence of this variety of features is proof of continued use of the housepit depression for primary activities as well as refuse disposal.

Possibly the earliest feature in Zone 3 is Pit 33-1 (Feature 10), a large shallow pit just outside the housepit depression in 6N42W (Figure 6-5). This pit originates near the bottom of Stratum 300 and was dug into Stratum 380, the same sand stratum into which the housepit itself was dug. Measuring 85 cm in diameter at its surface, this basin-shaped pit is 30 cm deep. Its fill consists of shell and bone fragments in a dark brown sandy soil, very distinct from the surrounding yellow sand of Stratum 380. The bone was not very well preserved. No formed tools and only one FMR were found in Pit 33-1. We infer that Pit 33-1 served as a trash pit.

Shell Concentration 33-E (Feature 70) is outside the southern rim of Housepit 3. It is apparently early in the sequence of Zone 33 features as it occurs only slightly above the Housepit's surface of origin. We cannot determine if it is associated with other features.

Another early feature, just outside the housepit depression, is a debris-strewn surface of dark brown silt (Occupation Surface 33-A). Like other features on the south side of the Housepit 3 depression, this scatter contains relatively large amounts of shell, as well as bone. The major characteristic of this feature, however, is the amount of debitage: 254 waste flakes, of which 212 are opal. Only two of the eight tools are of opal. Designated in 0N48W (Features 72 and 69), this surface was defined in the eastern three-quarters of the unit; the western quarter had slumped prior to excavation. Occupation Surface 33-A is a use surface, possibly the site of tool manufacture, which postdates the Housepit 3 occupation.

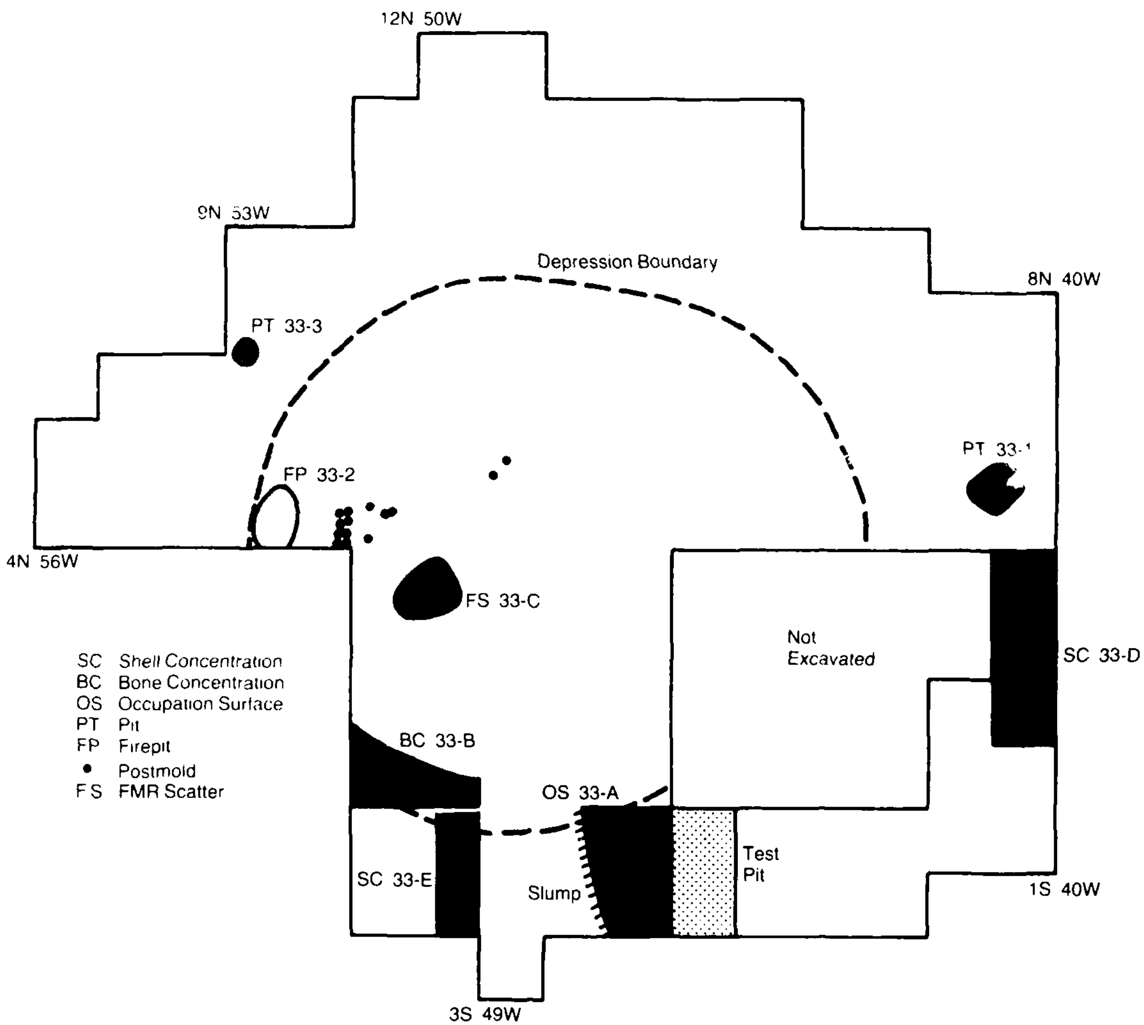

Figure 6-5. Features in Housepit 3 (Area 3), Zone 3, 45-OK-258.

Perhaps somewhat later than Occupation Surface 33-A is Bone Concentration 33-B, a concentration of FMR, shell and small bone fragments in unit 2N51W (Feature 83). Confined to the southern half of the unit, this concentration lies partly on the parent soil in which Housepit 3 was dug and partly on the housepit fill. This indicates the surface was utilized during the filling of the housepit depression when some of the original wall was still exposed. We must caution the reader, however: excavators discerned no surface, other than differentiation of fill and parent matrix. The mean bone weight in this feature is small compared to the bone layer above ($\bar{x}$=0.32), but larger than that found in housepit floors. Only four pieces of bone were identified as deer (1), deer-sized (2), and salmon (1). Three of the four were burnt. Since the feature matrix showed no evidence of firing, the bone were apparently burned elsewhere. Most of the debitage (44 of 57) is opal, perhaps indicating the manufacture or repair of tools. Only one of the four tools recovered, a unifacially retouched flake, is opal.

Near the middle of the housepit fill, a thin clay stratum covers most of the housepit depression. While this clay stratum yielded little in terms of material culture, it was called the "postmold layer" because of the fourteen postmolds which occur within it. The postmolds, for the most part, did not extend above or below the clay layer, which is five to ten cm thick. Eight postmolds were recorded in 5N52W (Feature 15), four in 5N51W (no feature number), and two in 6N49W (Feature 29). Table 6-4 records their dimensions. No obvious alignment of the postholes can be determined, although a general arc-shape might be inferred. We find the double row of small postmolds in 5N52W of special interest, although it is difficult to discern its function. One possibility is a drying rack, but ethnographic and archaeological literature do not contain ready analogues. No formed tools or fire-modified rock, and little shell or debitage, occur within the clay layer in the 10 square meters which it covers.

A firepit (Firepit 33-2), uncovered in 5N53W, at the same level as the postmold layer, apparently was not associated with it. This firepit (Feature 14) is 75 by 50 cm at its surface and 30 cm deep; conical in profile, it contains fire-modified rocks and pockets of ash and charcoal. Slightly younger than the postmold layer, it lies at the top of the housepit fill at the rim of Housepit 3.

The second feature above the postmold layer is a concentration of fire-modified rock (FMR Scatter 33-C) in 4N51W (F63). Most of the 47 FMR are tightly clustered in a 50 x 50-cm area, but the entire feature extends to 95 x 75 cm. The mean weight of the FMR is 311 g, which is quite high. Since no charcoal, charcoal staining, or oxidized earth occurred within FMR Scatter 33-C, this feature may be a dump or pile of FMR removed from a firepit elsewhere.

Pit 33-3 (Feature 37), the last feature within the housepit depression, occurs just below the bone layer in 7N53W. A shallow, basin-shaped pit, it is only 12 cm deep, and measures 55 x 20 cm on its surface. Fire-modified rock and large bone fragments fill the pit; reddish soil marks its perimeter. This reddening, however, does not appear to have resulted from firing. None of the

lithics or identified bone show any signs of burning: we conclude that Pit 33-3 is a trash pit.

Finally, a feature to the southeast of Housepit 3 ties this area with the Zone 3 deposits above Housepit 5. This is Shell Concentration 33-D, originating in Stratum 300, and exposed over a 1 x 3-m area. A thick and very dense shell stratum sloping to the south and east, it contains moderate densities of bone fragments, and FMR as well.

HOUSEPIT 4 (AREA 4)

The northern half of Housepit 4, all that remained, was investigated with one 2 x 2 and one 1 x 2-m unit. A single feature number (F400) was applied to both the fill and floor. Material listed in the Zone 3 tables, therefore, is from both. Four separate features were distinguished during excavation: Bone Scatter 43-A, and Pits 43-1, 43-2, and 43-3. The last two pits originate in the first pithouse floor, while the bone scatter and first pit are associated with a younger floor or an occupation surface in the fill.

Bone Scatter 43-A (Feature 13) is a heavy concentration of butchered and splintered bone surrounded by burned orange soil. A possible firepit containing extensive burned soil and charcoal was recorded as part of this feature. It yielded a radiocarbon date of 2408±152 B.P. (B-4301). Of 210 identified bone fragments (Table 6-9), however, only three were burned, indicating that the oxidizing of the soil and butchering of the deer were two distinct activities. While butchering tools predominate among the objects recovered with the bone scatter, they do not make up the entire assemblage (Table 6-10). Pit 43-1 (Feature 28) apparently originated in the bone scatter, although it was not given a separate feature number until level 210, fully 50 cm below its point of origin. At its bottom, excavators recovered a large number of large pieces of bone (18 identified as deer or deer-sized). The other artifact classes, however, were sparsely represented, so we assume it was not a general refuse pit. Nor is it necessarily a roasting pit; none of the lithics or identified bone was burned and there was only one FMR, despite the dark, stained soil and charcoal in the fill. While its function remains obscure, it must be closely tied to the butchering area in which it originates. This pit is 60 cm deep and approximately 75 cm in diameter.

Although Housepit 4 was not well defined, we were able to determine that two other pits originate there. Pit 43-2 (Feature 50) is 30 cm in diameter and 20 cm deep. It contained many small ($\bar{x}$ = 0.17 g) bone fragments, over fifty shell hinge pieces, and two large FMR. One waste flake, two of the six stone tools, and four of the 14 identified bone fragments were burned, but not necessarily within this pit. Pit fill differed little from general house fill: excavators noted no burnt soil or intensive charcoal staining. Pit 43-2 may have been a trash pit.

While Pit 43-3 (Feature 51) , 45 cm across and 30 cm deep, is slightly larger than Pit 43-2, it seems to have served a similar purpose. Its unremarkable fill contained bone and shell fragments, ten FMR, formed objects

and debitage. Excavators noted a greater density of cultural material than in surrounding floor levels. This suggests that Pit 43-3 is also a trash pit.

A dog burial uncovered in Area 4 (0N62W) was not directly associated with Housepit 4. Excavators recovered 190 bones, many of which were still articulated, although rodents had disturbed them. These formed a nearly complete skeleton. Excavators could discern no evidence of a pit, although the dog's body had apparently been in the flexed position, indicating deliberate interment. With the burial were recovered salmon bones--apparently the remains of the dog's last meal. The burial covered a 45 x 26-cm area and was 16 cm deep.

AREA 5

Zone 3, in Area 5, encompasses occupations and activities within the fill of Housepit 5. The western half of the area yielded most of the cultural features, although a bone concentration (Feature 88) was recorded in 2S35W. A bone concentration/occupation surface (Feature 65) above the mottled yellow sand which capped the original occupations of Housepit 5 yielded a date of 2455±126 B.P. (B-4304). The mottled yellow sand (Feature 68), which lies between this surface and the upper floors of Housepit 5, contains much material, presumably brought up from the floor below by rodent action (although rodent disturbance apparently was not excessive). Because, however, the sand stratum provided the base for the formation of the occupation surface and is included in Zone 3 deposits, material from Features 65 and 68 are tabulated together in Tables 6-8, 6-9, and 6-10.

The surface (Feature 65) was recorded in 0N40W. About 20 cm thick, it slopes down to the east, and is characterized by a charcoal-stained, clay-like matrix, debitage, and small bone fragments. Excavators estimated that 15% of the bone was burnt. They recovered three bone, but no stone, tools. Most of the identified bone is from fish and deer; coarse quartzite constitutes 52% of the debitage. Quartzite was the dominant type of debris in Housepit 5, Zone 5 as well, but was succeeded by opal in Zone 4.

A second occupation surface, perhaps the southern extension of Feature 65, was also recorded in 2S39W (Features 143, 146, and 149). This surface sloped south to north, seemingly against the contours of the Housepit 5 depression. It may represent some excavation/modification within the Housepit 5 fill. The assemblage include several unusual objects--nine pieces of elk antler fragments, three flaked long bones, and an anvil stone.

A bone concentration was uncovered in 2S35W, on the east edge of Area 5. Twenty to twenty-five cm thick, it never covered more than one quarter of the 2 x 2-m unit. Both its slope (from west to east) and its proximity to Area 2 suggest that it links the Zone 3 occupations in Areas 2 and 5. Another piece of evidence further supports this inference: 54% of the lithic debitage from this feature is jasper, which makes it resemble the features of Area 2 more than the Zone 3 features from the west side of Area 5.

AREA 6

Excavators recorded two firepits in Zone 3, Area 6, one immediately above the other. They only partially exposed the earliest, Firepit 63-1 (Feature 2). It is lenticular in cross section, 14 cm deep, and 100 x 50 cm in plan. The pit contained burnt soil, charcoal chunks, and carbon staining in addition to the material listed in Tables 6-8, 6-9, 6-10. Rodents have disturbed it.

Firepit 63-2 (Feature 1) is a scatter of a few FMR, charcoal, and carbon-stained soil in a 100 by 50-cm area. It lies a mere 10 cm above Firepit 63-1, but has no physical connection with it. Most of the debris recovered is small bone fragments, broken shell, and jasper waste flakes.

ANALYTIC ZONE 2

Features were recorded in Areas 2, 3, 4 and 5 in Analytic Zone 2. Their contents are summarized in Tables 6-11, 6-12 and 6-13.

AREA 2 (HOUSEPIT 2)

Area 2, Zone 2, contains the last housepit recorded at the site and possibly the second constructed in Area 2. This youngest housepit, radiocarbon dated to 801±58 B.P. (TX-3387) is very shallow (less than 40 cm) and may have been a shallow surface structure. The depression was still very conspicuous when excavations began. Although the southern portion of the housepit had been lost to erosion (Figure 6-6), we were able to determine its diameter: 7.5 m. Within the housepit, excavators recorded few features: a large pit, a firepit, an extensive bone concentration, and a small shell concentration.

Pit 22-1 (Feature 80) is a deep (85 cm) stratified pit in 4N33W. At least nine different lenses of fill occurred either within or around its lip. Most of the material was concentrated at the bottom, in the middle, and just outside the 1-m wide, circular pit. At the bottom of the pit in a very dark matrix (F126) were found FMR and crushed bone ($\bar{x}$=0.089 g). Above this was a layer of light brown silt (Feature 125) overlain by another cultural layer (F122) with several thin horizontal black stains. This layer also contained bone, including an unidentified bone tool, and some FMR. Again, the bone was exceedingly small ($\bar{x}$=0.063 g). This layer was capped by another, lighter lens (F120); a final layer of cultural material (F114) with lesser amounts of FMR and crushed bone ($\bar{x}$=0.083 g) surmounts it all. An apparently natural deposit of gravel-bearing silty sand caps the pit. In the darkly stained stratum in which the pit originates, and which appears to be part of the floor of Housepit 2 (Feature 115, 118), are numerous, slightly larger bone fragments, some shell, FMR, and a single large milling stone. It will be remembered that this pattern--a large stone associated with a pit containing many small bone fragments--occurred three times in Housepit 3, Zone 4.

Table 6-11. Material recovered from features, Zone 2, 45-OK-258.

Feature by Area (Field number)	Debitage	Formed Objects	Bone		Shell		FMR	
			#	grams	#	grams	#	grams
Area 2 (Housepit 2)								
Fill and floor (F201)	1,065	117	18,391	5,472	980	3,285	313	33,541
Pit 22-1 (F80)	24	4	613	54	29	60	19	1,685
Firepit 22-2 (F8)	237	20	2,133	469	-	2	32	1,528
Bone Concentration (F12, F17)	302	29	9,985	6,215	15	46	141	2,284
Area 3								
Bone Layer—see Table 6-15								
Surface 32-A (F52, F53)	167	9	440	120	-	-	12	666
Surface 32-B (F49)	53	7	786	175	51	101	2	405
FMR Scatter 32-C (F55)	35	1	434	186	5	13	90	14,544
Debris Concentration 32-D (F61)	65	7	395	63	154	597	39	6,655
Area 4								
Pit 42-1 (F5)	15	1	73	31	16	50	3	314
Pit 42-2 (F6)	1	-	150	16	86	296	2	236
Area 5								
Bone Concentration 52-A (F81)	199	15	12,883	3,461	560	1,156	181	11,580
Bone Concentration 52-B (F59)	81	4	5,772	1,895	234	835	37	3,718
Shell Concentration 52-C (F21)	8	2	603	205	403	1,900	26	1,830
Shell Concentration 52-D (F58)	1	-	141	47	171	380	7	400
Occupation Surface 52-E (F139, F140)	10	3	679	238	15	-	76	9,832

Table 6-12. Identified bone from features, Zone 2, 45-OK-258.

Feature by Area (Field number)	Deer	Deer-Sized	Elk	Cervidae	Mountain Sheep	Pronghorn Antelope	Dog	Coyote	Bear	Salmonidae	Cyprinidae	Salamander	Painted Turtle	Snake	Pocket Gopher	Pocket Mouse	Deer Mouse
Area 2 (Housepit 2)																	
Fill and floor (F201)	112	437	-	2	1	-	-	1	-	-	1	-	5	5	-	-	1
Pit 22-1 (F80)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	4
Firepit 22-2 (F8)	10	5	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Bone Concentration (F12, 17)	199	543	-	-	68	1	-	-	-	-	3	-	-	-	-	-	-
Area 3																	
Bone Layer--see Table 6-16																	
Surface 32-A (F52, F53)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Surface 32-B (F49)	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FMR Scatter 32-C (F55)	7	11	-	-	-	2	24	-	-	-	-	-	-	-	-	-	-
Debris Concentration 32-D (F61)	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Area 4																	
Pit 42-1 (F5)	-	1	-	-	-	-	-	-	-	-	-		-	-	-	-	-
Pit 42-2 (F6)	-	-	-	-	-	-	-	-	-	3	-		-	-	-	10	-
Area 5																	
Bone Concentration 52-A (F81)	227	197	1	-	-	-	-	-	-	2	-	22	-	2	-	-	-
Bone Concentration 52-B (F59)	140	140	-	-	4	-	-	-	-	1	-	4	-	1	-	-	-
Shell Concentration 52-C (F21)	-	4	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-
Shell Concentration 52-D (F58)	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Surface 52-E (F139, F140)	3	10	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-

Table 6-13. Formed objects from features, Zone 2, 45-OK-258.

Feature by Area (Field number)	Utilized Only Flake	Unifacially Retouched Flake	Bifacially Retouched Flake	Biface	Projectile Point	Projectile Point Base	Projectile Point Tip	Blade	Linear Flake	Drill	Graver	Scraper	Burin Spall	Core	Tabular Knife	Hammerstone	Chopper	Millingstone	Stone Bead	Bone Bead	Indeterminate Bone/Antler	Indeterminate Stone	Indeterminate Other
Area 2 (Housepit 2)																							
Fill and floor (F201)	31	6	2	15	7	5	8	1	-	1	3	-	2	-	5	1	-	-	-	-	28	1	1
Pit 22-1 (F80)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	1	-	-	2	1	-
Firepit 22-2 (F8)	11	1	-	4	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bone Concentration (F12,17)	6	1	1	5	1	1	2	1	-	-	-	-	-	-	4	1	4	-	-	-	2	-	-
Area 3																							
Bone Layer—see Table 6-17																							
Surface 32-A (F52, F53)	2	-	-	3	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Surface 32-B (F49)	1	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	2	1	-
FMR Scatter 32-C (F55)	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Debris Concentration 32-D (F61)	-	-	1	-	-	-	-	-	1	-	-	-	-	-	1	2	2	-	-	-	-	-	-
Area 4																							
Pit 42-1 (F5)	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pit 42-2 (F6)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Area 5																							
Bone Concentration 52-A (F81)	2	-	-	-	-	-	1	-	-	-	-	1	-	-	5	1	-	-	-	-	4	1	-
Bone Concentration 52-B (F59)	1	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-
Shell Concentration 52-C (F21)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-
Shell Concentration 52-D (F58)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Surface 52-E (F139, F140)	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	1	-	-

A 1 x 1 x 0.10-m area was excavated as Feature 8, the hearth area in Housepit 2. This firepit consisted of fire-modified rock, bone, debitage, and formed objects scattered randomly over a surface of charcoal-stained soil. A large circular area (85 x 95 cm) of burnt orange earth lay just south of the debris scatter. Among the identified bone from the hearth area are those of deer and mountain sheep. This hearth area lies just south of the house floor's center.

North of the firepit area is a large bone concentration, originally recorded as two distinct features (Features 12 and 17). Most of the bone is quite large ($\bar{x}$=0.62 g) and is deer or deer-sized (Table 6-12). Excavators also recovered a large variety of formed stone tools, including four choppers (the general fill and floor of Housepit 2 contained no choppers: see Table 6-13). The debitage in this bone scatter was predominantly of clear chalcedony, indicating stone reduction occurred along with the butchering activities of this area. The bone concentration was mixed with a charcoal-stained and oxidized surface and often contained clusters of burned bone. In 3S31W, this occupation surface sloped south, down away from the bone scatter to join the firepit in 4S31W (Feature 8). It may be, then, that the bone scatter is not part of the Housepit 2 floor, but lies slightly above it and accumulated just after the abandonment of Housepit 2.

Tables 6-11, 6-12, and 6-13 show the general fill and floor materials and material from specific features which were recovered from Housepit 2. As the tables clearly show, the quantity of recovered material is quite high and includes a wide variety of formed tools. Apparently, the occupation of Housepit 2 was of some duration and/or intensity.

AREA 3

The most striking feature of Zone 2, Area 3 is the layer of bone which blankets the Housepit 3 depression. Tables 6-14, 6-15, and 6-16 summarize the contents of this concentration by unit. We have included both featured and unfeatured unit levels. Figure 6-7 shows the units in which the bone layer was assigned field feature numbers. Excavators assigned feature numbers to unit levels in which the bone count was greatest; these all fall within the rim of Housepit 3. Outside the rim, high bone counts continue, but never in the same concentration as the bone features inside the rim. Apparently, the Housepit 3 depression served as a dump during this time. Although many of the bone fragments have butchering marks on them, the lack of compacted surfaces and staining indicates that the area was used for secondary disposal rather than as a surface for primary, *in situ* activity.

Figure 6-7 shows the distribution of identified bone by unit. While deer and deer-sized predominate among the identified bone, mountain sheep bone form a consistent portion of the identified bone in most units and even predominates in the northwest quadrant of the housepit depression. We cannot know whether these concentrations represent the butchering of single animals or the dumping of bone from several animals; probably both occurred. The recovered bones represent almost the entire animal--teeth, long bones,

Table 6-14. Material recovered from bone concentration by provenience, Zone 2, Area 3, 45-OK-258.

Provenience/ Feature	Debitage	Formed Objects	Bone			Shell		FMR		
			N	grams	grams/N	N	grams	N	grams	grams/N
7N53W,5N52W F38 (2x2)	82	6	1,996	1,762	0.88	42	54	15	615	41.0
7N51W F34 (2x2)	30	8	1,330	1,604	1.20	3	6	6	474	79.0
7N49W F20 (1x1)	18	3	886	653	0.74	1	6	4	210	53.0
7N49W F32 (2x2)	101	15	3,472	2,174	0.63	10	16	19	2,185	115.0
7N46W F40 (2x2)	4	-	446	715	1.60	-	1	-	-	-
6N49W (1x1)	-	12	787	-	-	-	-	18	-	-
5N51W (1x1)	-	1	151	-	-	-	-	6	-	-
5N50W F22 (1x1)	104	6	1,094	493	0.45	1	2	24	1,030	43.0
5N49W (1x1)	-	2	995	-	-	1	-	8	-	-
5N48W F30 (1x1)	45	1	354	178	0.50	1	3	7	1,185	169.0
5N47W F23 (1x1)	-	-	92	337	3.60	2	-	6	-	-
5N46W F18 (1x1)	18	3	534	571	1.07	4	5	6	450	75.0
4N51W F57 (2x2)	224	12	2,087	1,005	0.48	3	10	41	2,586	63.0
4N49W (1x1)	-	11	818	-	-	-	-	22	-	-
4N48W F56 (2x2)	81	15	1,748	1,824	1.04	-	4	59	9,575	162.0
3N49W (1x1)	-	4	273	-	-	-	-	30	-	-
2N51W F77 (2x2)	54	3	1,398	1,511	1.08	10	19	27	3,410	126.0
2N48W F78 (2x2)	33	3	520	344	66.00	18	81	49	5,624	115.0
Total	794	105	18,981	13,171		96	207	347	27,324	
Density (volume = 3.26 m^3)	243.5	32	5,822	4,040		29.4	63	104.6	852,489	

Table 6-15. Identified bone by provenience in bone concentration, Zone 2, Area 3, 45-OK-258.

Provenience/ Feature	Deer	Deer Size	Mountain Sheep	Pronghorn Antelope	Horse	Porcupine	Salmon
7N53W,5N52W F36 (2x2)	39	179	38	3	–	–	–
7N51W F34 (2x2)	19	21	46	4	–	–	–
7N49W F20 (1x1)	5	17	19	–	–	–	1
7N48W F32 (2x2)	37	66	39	–	–	–	–
7N46W F40 (2x2)	13	88	7	1	–	–	–
6N49W (1x1)	4	2	5	–	–	–	–
5N51W (1x1)	–	2	1	–	–	–	–
5N50W F22 (1x1)	7	13	22	–	–	–	–
5N49W (1x1)	21	6	–	–	–	–	–
5N48W F30 (1x1)	2	5	4	–	–	–	–
5N47W F23 (1x1)	6	4	–	–	4	–	–
5N46W F18 (1x1)	8	10	4	–	–	–	–
4N51W F57 (2x2)	37	70	11	–	–	1	–
4N48W F56 (2x2)	33	114	27	–	–	–	–
3N49W (1x1)	1	6	2	–	–	–	–
2N51W F77 (2x2)	17	231	11	5	–	–	–
2N48W F78 (2x2)	3	49	7	–	–	–	–

Table 6-16. Formed objects by provenience in bone concentration, Zone 2, Area 3, 45-OK-258.

Provenience/ Feature	Utilized Only Flake	Unifacially Retouched Flake	Bifacially Retouched Flake	Resharpening Flake	Biface	Projectile Point	Projectile Point Base	Projectile Point Tip	Linear Flake	Drill	Graver	Scraper	Burin Spall	Core	Tabular Knife	Hammerstone	Edge-ground cobble	Millingstone	Pipe	Indeterminate Bone/Antler	Indeterminate Stone
5N52W,7N53W F36 (2x2)	-	-	-	-	-	1	-	-	-	-	1	1	-	1	-	-	-	-	1	1	-
7N51W F34 (2x2)	-	2	-	1	-	3	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-
7N48W F20 (1x1)	1	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
7N48W F32 (2x2)	3	3	-	2	-	1	-	1	1	-	-	-	-	3	-	-	-	-	-	-	-
6N48W (1x1)	5	1	-	1	-	1	-	-	1	-	-	-	-	-	2	1	-	-	-	-	-
5N51W (1x1)	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
5N50W F22 (1x1)	1	-	-	1	-	2	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-
5N48W (1x1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
5N48W F30 (1x1)	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5N46W F15 (1x1)	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-
4N51W F67 (2x2)	2	-	-	1	1	1	-	-	1	1	-	1	-	-	1	-	-	1	-	1	-
4N48W (1x1)	2	1	1	-	-	3	-	1	-	1	1	-	-	-	-	-	-	-	-	1	-
4N48W F56 (2x2)	5	-	-	2	-	1	-	-	2	-	-	-	1	-	-	-	1	2	-	-	2
3N48W (1x1)	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2N51W F77 (2x2)	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
2N48W F78 (2x2)	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1

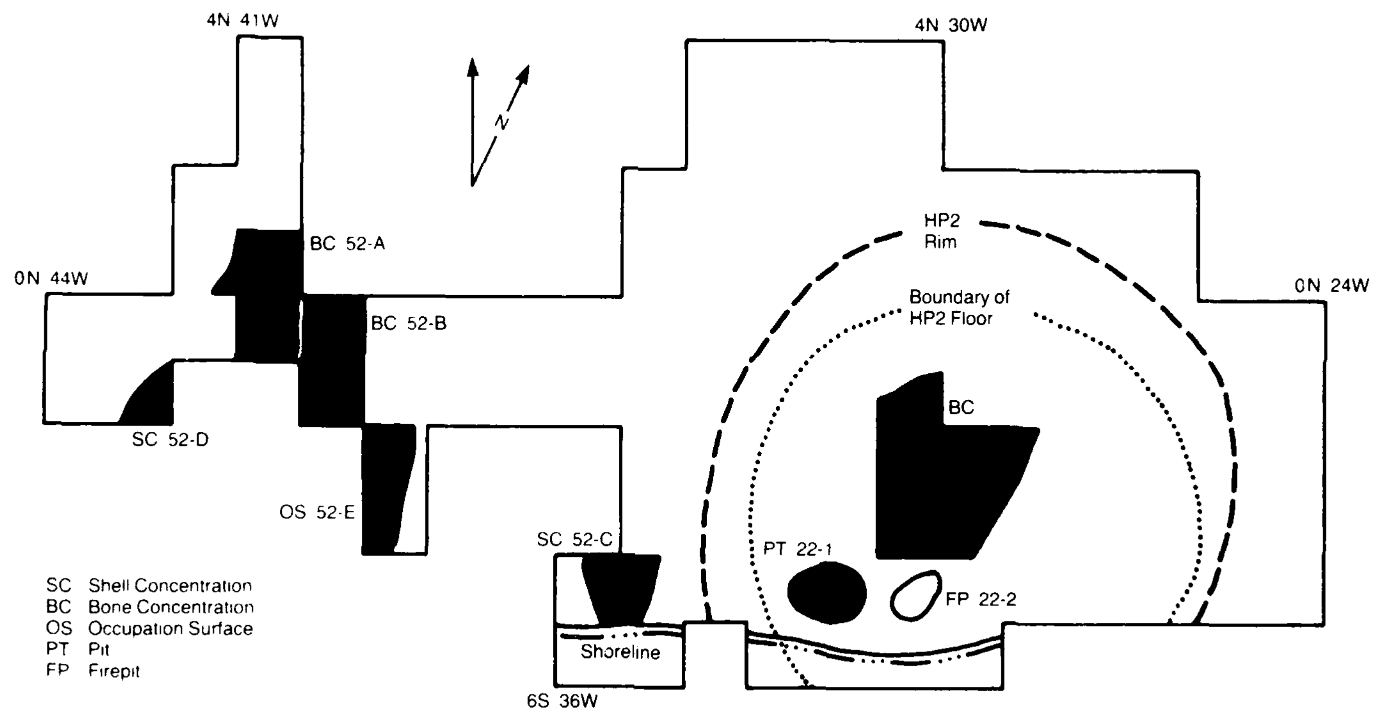

Figure 6-6. Features in Housepit 2 (Area 2) and Area 5, Zone 2, 45-OK-258.

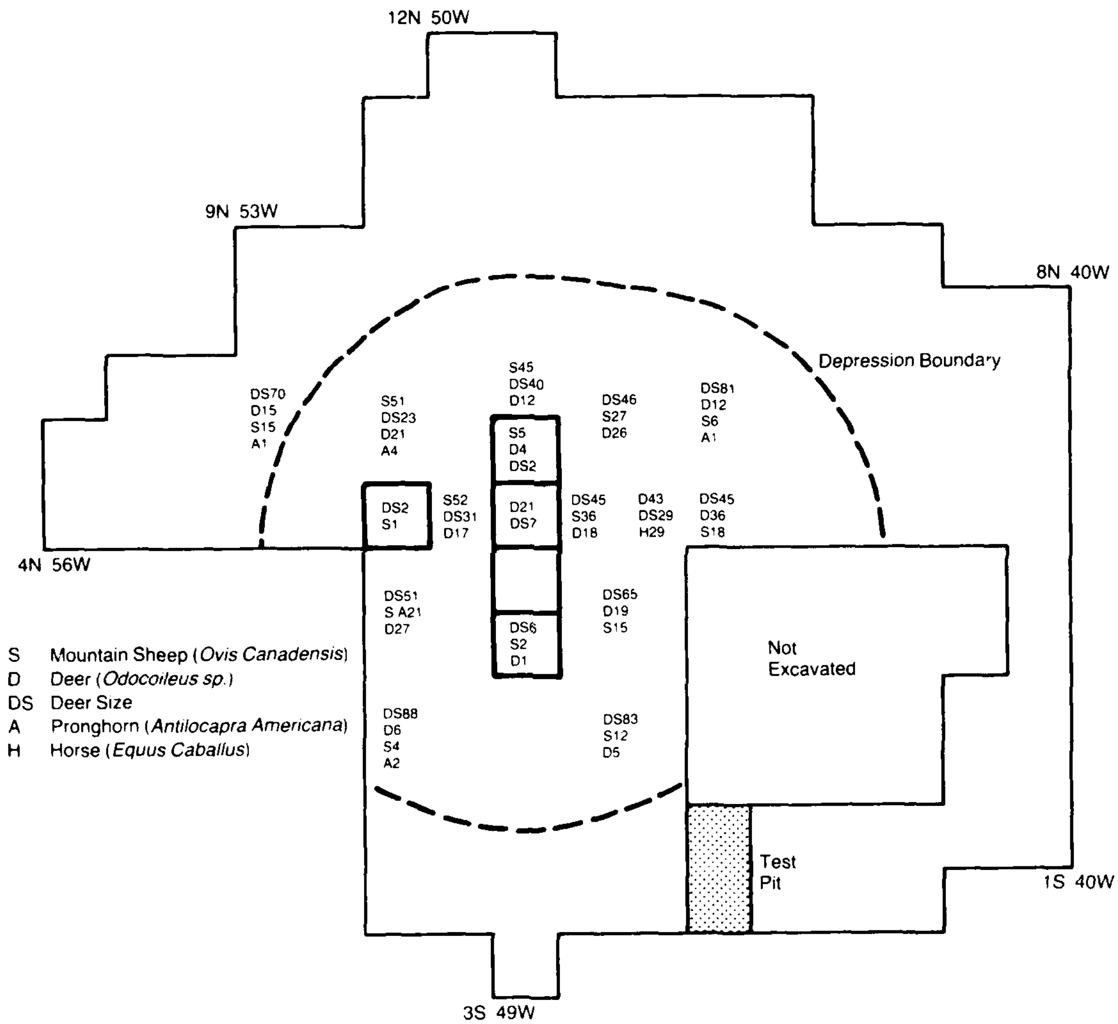

Figure 6-7. Distribution of identified faunal remains in the bone layer, Area 3, Zone 2, 45-OK-258 (units outlined in bold were not features; numbers in these units are counts. All other numbers are percentages).

footbones, vertebrae, ribs. Skull fragments, antlers, or horn core fragments are rare. Where the counts of deer-sized bone are high, rib fragments make up a large portion of the total, 69 or 179 in 7N53W, 50 of 114 in 4N48W, and 79 of 231 in 2N51W (in the last, scapula fragments add another 37). While many of the identified bones show butchering marks (primarily flake scars), none are burned.

Table 6-17 shows the provenience of formed objects in the bone layer. Despite the small sample size, some possible patterns do emerge. Projectile points, like mountain sheep bone, occur most frequently in the northwest section of the bone layer, while unifacially retouched flakes predominate among assemblages in the southern half. We could discover no correlation of object types with species, body parts, or types of butchering marks. Therefore, the pattern observed in the distribution of formed objects is probably fortuitous, rather than the result of specific activities in specific areas. Other patterns may be fortuitous as well. For example, the mean weight of bone fragments varies, with smaller fragments ($\bar{x}$=0.1 g) in the center and northern sections of the bone layer. This, however, probably reflects differences in field recording and collection, i.e., whether the entire unit level was collected as part of the bone layer or only selected areas of the unit were featured. In the case of 5N47W, for example, Feature 23 contains only 92 bone fragments with a mean weight of 3.6 grams. In this unit, however, excavators collected only the largest bones as part of the feature. When we consider spatial patterns, these inconsistencies in collection must be taken into account. There is one pattern, however, which cannot be similarly discounted: the distribution of fire-modified rock with a mean weight of 100 or more grams in the eastern and southern sections of the bone layer. We have not found a reasonable explanation for this.

Besides the bone layer, two other occupations occur in Zone 32. One is above the bone layer, the other appears to be earlier.

Two areas of dark staining in the ubiquitous brown loamy sand were uncovered, in 4N49W and 0-1S49W. The occupation surface (Feature 52, 53) occurs just below the bone layer or is mixed with it. It may offer the only evidence of an actual activity surface associated with the bone layer, although it probably precedes it. A large number of waste flakes were found with this surface. The mean weight of the bone fragments ($\bar{x}$=0.27 g) is smaller than in any of the bone layer unit levels but similar to that of other occupation surfaces. The projectile point, two of the bifaces, the broken bases and tip, and 93 flakes are of chalcedony (see Table 6-13): this surface may represent the manufacture or repair of chalcedony objects. The remaining tools as well as 54 flakes, including 12 showing heat treatment, are of jasper. The remaining flakes are of quartzite and basalt.

The second occupation surface (Feature 49) predating the bone layer lies outside the housepit depression in 0-1S49W. This was an irregularly-shaped, dark-stained area, with scattered rock and debris and pockets of burned shell.

Two concentrations of debris represent an occupation above the bone layer. The first is an FMR scatter (Feature 55) in 0N50W. This area of dense fire-modified rock lay near the present-day surface and had been disturbed.

Excavators collected 90 fire-modified rocks from the 1 x 1-m area; several were clustered tightly in a circular arrangement 20 cm in diameter. Excavators could discern no charcoal or charcoal staining with the cluster of FMR, although they noted occasional flecks that occurred throughout the unit level. Nor were any of the small bone fragments burned. This cluster could represent a firepit from which all evidence of _in situ_ firing has disappeared, or it may be a pile of fire-modified rocks removed from a firepit elsewhere. A debris scatter (Feature 61) covering most of 0N48W is apparently associated with the above FMR scatter. The debris lay on a thin (3-5 cm) surface of burned or dark-stained sandy silt. Like the surface below the bone layer, the bone fragments are very small ($\bar{x}$ = 0.16 g) and most of the tools and debitage are made from the same material. In this case, that material is coarse-grained quartzite; jasper, chalcedony, and opal waste flakes together make up [illegible]0% of the debitage. The presence of these two surfaces well above the bone layer implies that the site continued to be occupied after the 631 B.P. date obtained from the bone levels. This inference is supported by the presence of horse bone in a bone layer level (see Table 6-15). This horse bone may have originated higher up or, possibly, the dumping activity represented by the bone layer could have spanned several hundred years, from at least 600 B.P. to the introduction of the horse.

AREA 4

Two exterior pits are recorded in Area 4, Zone 2. They are not directly associated with any housepit. Pit 42-1 (Feature 5) is a deep (70 cm) conical pit, measuring 120 cm across. Dug into Stratum 321, a site-wide stratum of yellow sand, it was badly disturbed by rodents. The top of the pit was a dark humic stain while the rest of the fill was light gray with charcoal flecks. Most of the debris, including some FMR, and some orange-stained soil, was concentrated in the lower 30 cm of the pit. Although the orange and gray soil suggest burning in the pit, none of the debitage, tools or identified bone were burned. Pit 42-1 may originally have been a roasting pit, and was later used for trash.

Pit 42-2 (Feature 6) shows at least three episodes of use. The origin of the earliest episode is obscured by the later two, both of which appear to fall in Zone 2. Altogether, Pit 42-2 is 80 cm deep. The middle component is 60 cm deep, while the upper component--a concentration of shell--is 15 cm deep. Oval in shape, Pit 42-2 diminishes from 63 cm across at the surface to 47 cm across at the bottom. The earliest pit is characterized by grayish, ashy soil, charcoal fragments, and the badly decomposed remains of a large salmon. The second pit's fill is mottled with areas of intense orange soil, charcoal flecks, and a small strip of light-colored silt. The silt layer suggests that the pit was open for a time and then later filled in by a cultural stratum. When the pit had filled, a basin-shaped pit was dug for cooking mussel. A thin, dense layer of hinged mussel shells in a basin of burned earth remains of this last episode.

AREA 5

As with other areas of the site, Zone 2 in Area 5 is characterized by dense concentrations of bone and shell. The bone layer, however, is not so pervasive as it was in the Housepit 3 depression. Indeed, its only bone features occur at its western edge, near Housepit 3. It may be that the occupation of Housepit 2 at this time precluded the accumulation of refuse near Housepit 2.

Excavators recorded dense bone concentrations in 0N42W (Bone Scatter 52-A, Feature 81) and 0N40W (Feature 59). As with the Housepit 3 bone layer, no occupation surface was noted. The bones lay on a relatively sterile stratum of sand which capped the occupation levels of Zone 3. While several species, including three types of fish, are represented among the bone, deer or deer-sized bones far exceed all other identified bone fragments. High numbers of teeth and jaw fragments augment the deer bone count. (Seventy-seven of 140 deer bone fragments are molar fragments in 0N42W; 188 of 227 are molar fragments in 0N40W.) The mean weight of the bone is similar for both units, although slightly larger in 0N42W (0.33 vs 0.27 g), and comparable to the mean weight of the Housepit 3 bone layer fragments. Excavators recovered a variety of tools from the two bone features. Many of them were of cryptocrystalline material, while roughly 50% of the debitage was coarse quartzite. This distinguishes this bone layer from that of Area 3, where jasper and chalcedony were the dominant material types.

Excavators also recorded two shell concentrations in Zone 2, Area 5. The first, Feature 21 in 4S36W, slopes down to the west, following the depression of Housepit 5. While only two tools were taken from this feature, several hundred bone fragments and some FMR were associated with it. The bone density does not approach that of bone layer features although the FMR is of similar density. Identified objects from this feature are listed in Table 6-13.

The second shell concentration (Feature 58) was located in a small triangular section in the southeast corner of 1S43W. Only 3-5 cm thick, this shell concentration sloped slightly to the south and may be part of Bone Concentration 52-A layer which follows the contours of the Housepit 5 depression. The number of bone is almost as high as the number of shell hinge pieces (shell was also very high in Bone Concentration 52-A) and the density of both is great, given the small area of the feature which was uncovered.

A possible occupation surface was recorded near the center of the Housepit 5 depression in 2S39W. This surface consisted of a FMR scatter (Feature 139) and the darker matrix (Feature 140) which underlies it. A third feature (F142), an amorphous accumulation of very dark matrix and charcoal-stained soil about 9 cm thick lying within the first matrix, is also included. This occupation level covered the entire 1 x 2-m unit and was 30 cm thick. Of the material recovered, only the high count of FMR and the two bear bone fragments are worth remarking.

SUMMARY

Housepit occupations occur in all four analytic zones in which cultural features were recorded, suggesting fairly constant use of the site for semi-permanent habitation from 3000 to 800 B.P. This may seem at first a rather large assertion to make. But the reader must remember that excavation at 45-OK-258 only sampled that portion of the site which remained before the last pool raise of the reservoir. It is highly probable that previous pool raises had covered most of the site. Therefore, our inference is not as far-fetched as it might first appear.

Some of the observed differences between feature assemblages may be related to feature function. For instance, housepit floors and exterior living surfaces contain a variety of formed objects and moderately sized bone fragments as well as other cultural features. Bone scatters, on the other hand, contain primarily cutting tools--utilized flakes, bifaces, and projectile points--and pounding tools--hammerstones, tabular knives, and choppers--that one might expect to be associated with butchering activities. Artifact assemblages in pits vary a great deal, reflecting no doubt, the various functions these pits fulfilled. The bone fragments that occur in pits, however, are generally much smaller than those that occur on exterior or interior living surfaces.

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APPENDIX A:

RADIOCARBON DATE SAMPLES, 45-OK-258

Table A-1. Radiocarbon date samples, 45-OK-258.

Lab Sample #1	Zone	DU	Stratum	Unit	Level	Feature #	Material/gms	Radiocarbon Age in Years B.P. T1/2=5568	Dendrocorrected Age (Years B.P.) T1/2=5730[2]
TX-2905	-	-	-	3N64W	170	1	Charcoal/3.6	2699∓230	2763∓235
	Firepit, Area 3, Zone 5. This date, from a testing unit, is shown as unassigned in Table 2-2 but is considered from Zone 5 in the feature and botany chapters. A flotation sample from Level 170, Feature 1, contained douglas fir (<u>Pseudotsuga menziesii</u>), larch (<u>Larix</u> sp.), hemlock (<u>Tsuga</u> sp.), and western goosefoot seeds (<u>Chenopodium fremontii</u>).								
TX-2906	-	-	-	0N87W	110	-	Charcoal/2.1	2936±230	3054±232
	Pit feature, Area 3, Zone 5.								
TX-3063	-	-	-	0N83W	50	-	Charcoal/4.6	3605±480	3899±491
TX-3385	-	-	-	8N49W	205	301	Charcoal/15.5	2260±80	2324±125
	Housepit 3 floor, Area 3, Zone 4.								
TX-3386	5	-	-	4S35W	170	24	Charcoal/2.8	2770±100	2951±170
	Large bone scatter on lower floor Housepit 5, Area 5, Zone 5. Collected as miscellaneous carbon sample. Three other samples, C-14 Master #83, 84, and 85, also were sent to be used if needed; uncertain if they were used. Sample contained occupation debris: ponderosa pine, lodgepole pine, semi-charred hemlock (<u>Tsuga</u> sp.), conifer bark, pitch, bitterbrush, willow (<u>Salix</u> sp.), <u>Lomatium</u> tissue, and starchy root cake.								
TX-3387	2	-	-	4S31W	35	201	Charcoal/6.1	800±50	802±58
	Housepit 2 floor, Area 2, Zone 2.								
TX-3388	1	-	-	2S29W	10	-	Charcoal/9.3	Modern	Modern
TX-3389	2	-	-	6N50W	120	-	Charcoal/10.2	533±43	559±57
TX-3390	2	-	-	6N47W	90	32	Charcoal/23.8	613±50	631±58
	Bone layer, Area 3, Zone 3.								

Table A-1. Cont'd.

Lab Sample #1	Zone	DU	Stratum	Unit	Level	Feature #	Material/gms	Radiocarbon Age in Years B.P. T1/2=5568	Dendrocorrected Age (Years B.P.) T1/2=57302
TX-3391	5	-	-	1S35W	175	33	Charcoal/11.4	2713±210	2878±216
Lower floor Housepit 5, Area 3, Zone 5. Sample was collected as a C-14 sample. A subsample contained: ponderosa pine, soft pine (<u>P. monticola/albicaulis</u>), hemlock (<u>Tsuga</u> sp.), juniper (<u>Juniperus</u> sp.), pitch, pine cone, bitterbrush (<u>Purshia</u>), <u>Lomatium</u>, and starchy root cake. Some ponderosa is semi-charred. No sign of disturbance noted.									
B-4297	4	-	-	14N64W	110	-	Charcoal/10.0	3050±60	3311±81
B-4298	4	-	-	7N70W	160	7	Charcoal/3.9	2750±90	2925±103
Exterior occupation surface, Area 4, Zone 4.									
B-4299	4	-	-	5N45W	175	301	Charcoal/5.0	2690±90	2851±103
Housepit 3 floor, Area 3, Zone 4.									
B-4300	6	-	-	4S25W	60	-	Charcoal/8.4	3250±60	3571±78
B-4301	3	-	-	2S66W	120+	400	Charcoal/5.0	2330±110	2408±152
Housepit 4, fill and floor (date probably from lower fill).									
B-4302	5	-	-	1S37W	215	123	Charcoal/6.0	2640±90	2787±103
Firepit 1, Housepit 5, Area 3, Zone 5. A flotation sample from Feature 33 contained: yellow pine, juniper (<u>Juniperus scopulorum</u>), bitterbrush (<u>Purshia tridentata</u>), serviceberry/hawthorn (<u>Amelanchier/Crataegus</u>), and hardwood bark. Some modern contamination noted--looks as if it were introduced into the sample by excavation techniques. The juniper is semi-charred. The serviceberry/hawthorn wood was considerably decomposed before it was charred.									
B-4303	4			0N69W	210	110	Charcoal/5.0	2460±100	2565±145
Pit 2, Housepit 5, Area 5, Zone 4. A flotation sample from Feature 110 contained occupation debris: douglas fir (<u>Pseudotsuga menziesii</u>), ponderosa pine (<u>Pinus ponderosa</u>), lodgepole pine (<u>P. contorta</u>), larch (<u>Larix</u> sp.), aspen or poplar (<u>Populus</u> sp.), and pitch. No disturbance.									
B-4304	3	-	-	1S40W	120	65	Charcoal/5.0	2370±70	2455±126
Occupation surface above Housepit 5, Area 5, Zone 3.									

1 TX samples were dated by University of Texas-Austin, Radiocarbon Laboratory.
B samples were dated by Beta Analytic, Inc.

2 Dates were converted to T1/2 = 5730 and dendrocorrected according to Damon et al. 1974.

APPENDIX B:

ARTIFACT ASSEMBLAGE, 45-OK-258

Table B-1. Individual projectile point data, 45-OK-258.

Master Number[1]	Morphological Type	Complete Morphological Class	Historic Type	Zone	Feature
1079	1	N1N11221NN3	81	34	301
1265	1	N1N11221NN1	81	32	-
1966	1	N1N11242NN1	81	54	205
1324	1	N1N12221NN1	81	32	-
2039	1	N1N12221NN3	81	53	88
983	1	N1N12121NN3	81	32	34
1490	2	N1N22221NN1	81	34	301
34	2	N1N22221NN1	81	-	-
604	2	N1N22241NN1	81	41	-
1394	2	N1N22241NN1	81	32	52
1335	2	N1N22241NN3	81	33	300
506	2	N1N21241NN1	81	44	7
1225	4	1NN23922NN1	42	31	-
1371	4	1NN29121NN1	63	32	-
2384	4	1NN21121NN1	63	41	12
1306	4	1NN23929NN9	-	32	-
2268	4	1NN29122NN1	-	22	8
2348	4	1NN29121NN1	42	22	201
1354	4	1NN21929NN9	42	32	-
2249	4	1NN22121NN3	42	22	201
2318	4	1NN23929NN9	42	22	201
1595	4	1NN25111NN3	42	32	57
2486	4	1NN25121NN1	42	Beach	-
954	4	1NN22121NN1	42	32	-
1057	4	1NN22121NN1	42	32	36
2250	4	1NN23121NN1	42	22	201
1145	4	1NN29929NN1	63	32	-
2530	5	N2NN2221121	21	Beach	-
35	5	N2NN9221193	21	-	-
859	5	N2NN1221123	21	33	300
1745	5	N2NN2221121	21	55	501
2532	5	N2NN3221123	15	Beach	-
857	5	N2NN2242121	51	32	-
2483	5	N2NN2221121	31	Beach	-
2023	6	22NN9229134	51	54	500
2499	6	22NN2231123	31	Beach	-
241	6	22NN2211121	31	53	-
1999	6	22NN5241121	31	50	200
2490	7	21212211NN1	51	-	-
1581	7	21212241NN1	51	33	300
1793	7	21214212NN3	51	54	-
1238	7	21219141NN1	52	33	72
1511	7	21212122NN3	52	34	301
1043	7	21212241NN1	51	99	-
1921	7	21212241NN1	51	50	-
341	7	21212132NN3	51	53	-
1936	7	21219222NN3	51	54	153
1209	7	21212241NN1	51	33	-
1876	7	21212291NN1	52	50	-
1026	7	21219222NN1	51	33	-
1616	7	21211242NN1	51	34	200
2448	7	21212241NN1	51	26	-
355	7	21214242NN1	51	63	-
1158	7	21212949NN1	51	33	-
1178	8	21222929NN1	51	32	-
1902	8	21224121NN1	53	50	-

1. Master numbers 36 are from testing.

Table B-1, cont'd.

Master Number	Morphological Type	Complete Morphological Class	Historic Type	Zone	Feature
1801	8	21214921NN1	51	50	-
2134	8	21229121NN3	51	21	200
1731	8	21222121NN1	53	52	59
316	8	21221929NN1	51	52	-
1015	8	21222221NN1	51	33	300
1574	8	21222211NN1	51	31	-
766	8	21222211NN1	51	32	-
2015	8	21222142NN3	51	53	-
2103	8	21221121NN3	51	54	204
246	8	21229111NN1	51	54	-
1985	8	21222291NN1	52	54	205
180	8	21222221NN3	51	43	-
1316	8	21221921NN1	51	99	11
1501	8	21222212NN1	51	34	301
1614	8	21222141NN1	51	33	300
1333	8	21222221NN1	51	33	300
274	8	21224121NN1	51	51	-
1448	8	21222142NN1	51	32	-
2120	9	1NN15921NN1	-	55	24
1954	9	21111211NN1	51	55	501
170	9	21115221NN1	51	43	-
2444	10	21121921NN1	-	20	200+UL
26	10	21123929NN1	51	-	-
676	10	21322949NN1	63	31	-
1435	11	31212121NN1	52	34	301
481	11	31212929NN1	52	44	7
2283	11	31212122NN1	52	21	200
1257	11	31211121NN1	52	35	302
2040	11	31212929NN1	52	54	500
2405	11	31211121NN1	52	25	200
2460	11	31211141NN1	52	26	-
509	11	31212122NN1	52	64	-
822	11	31211121NN1	52	32	-
1523	11	31211121NN1	52	34	301
1796	11	31212121NN3	52	55	501
1958	11	31212222NN3	61	53	-
911	11	31212929NN1	52	34	301
2439	11	31212141NN1	61	21	200
1068	11	31212929NN9	51	34	73
824	12	31222929NN1	52	32	-
880	12	31221929NN9	52	31	-
1269	12	31229142NN1	-	32	49
153	12	31221929NN1	51	32	-
1772	12	31229929NN1	-	50	-
831	12	31221211NN3	52	32	-
640	12	31221221NN1	52	42	-
123	12	31221122NN1	52	32	-
1967	12	31222121NN1	52	54	205
1173	12	31229121NN1	52	35	302
1002	12	31222912NN1	52	33	300
1387	12	31224121NN3	64	32	-
84	12	31229122NN1	51	20	-
354	12	31221111NN1	52	63	-
1146	12	31229212NN1	52	33	300
68	12	31222122NN1	52	33	-
1652	12	31222322NN1	53	33	-

Table B-1, cont'd.

Master Number	Morphological Type	Complete Morphological Class	Historic Type	Zone	Feature
1739	12	31224112NN1	53	54	500
1633	12	31222929NN1	51	33	83
511	13	31313121NN3	61	64	–
2002	13	31313921NN1	62	50	200
2500	13	31311121NN1	63	Beach	–
188	13	31311221NN1	61	42	5
2423	13	31112122NN1	61	23	200
1162	13	31112929NN1	52	33	–
1242	13	31112929NN1	52	33	69
636	13	31111321NN1	52	43	51
2487	13	31312121NN1	61	Beach	–
1167	13	31111929NN9	51	33	–
1201	13	31313921NN1	62	32	55
371	13	31319311NN1	61	64	3
967	13	31312929NN1	61	33	34
262	14	31129221NN1	51	99	–
184	14	31322211NN1	63	41	–
362	14	31129111NN3	52	64	–
743	14	31321921NN1	61	31	–
1685	14	31121929NN9	63	52	–
1694	14	31322122NN1	63	52	–
1555	14	31322121NN1	63	32	–
2227	14	31322929NN1	63	22	201
2488	14	31325929NN1	63	Beach	–
567	14	31321221NN1	63	63	–
322	14	31329112NN1	63	54	–
1380	14	31322121NN1	63	32	–
2324	14	31322121NN1	63	22	8
2138	14	31322121NN1	64	22	200
2375	14	31321321NN1	63	22	201
2244	14	31122121NN1	63	21	200
2020	15	41219121NN3	52	54	500
36	15	41212921NN3	71	–	–
2093	15	41219222NN3	71	55	24
1182	16	41222121NN1	75	32	–
870	17	41919129NN1	81	31	–
825	17	41112222NN1	71	35	–
997	17	41111229NN1	71	33	–
633	17	41311221NN3	71	43	13
643	17	41311221NN1	71	43	400
1305	18	41122321NN3	74	32	–
2319	18	41325821NN1	63	22	201
930	18	41322321NN1	63	32	20
2531	18	41129928NN1	81	Beach	–
1438	18	41321321NN1	75	32	–
1667	18	41323111NN1	75	35	302
2374	18	41321321NN1	75	22	201
1381	18	41321321NN1	75	32	–
1348	18	41322321NN1	75	32	–
913	18	41322321NN1	75	31	–
2252	18	41329929NN9	75	22	12
2125	18	41122929NN1	64	52	200
1556	18	41322921NN1	71	32	–

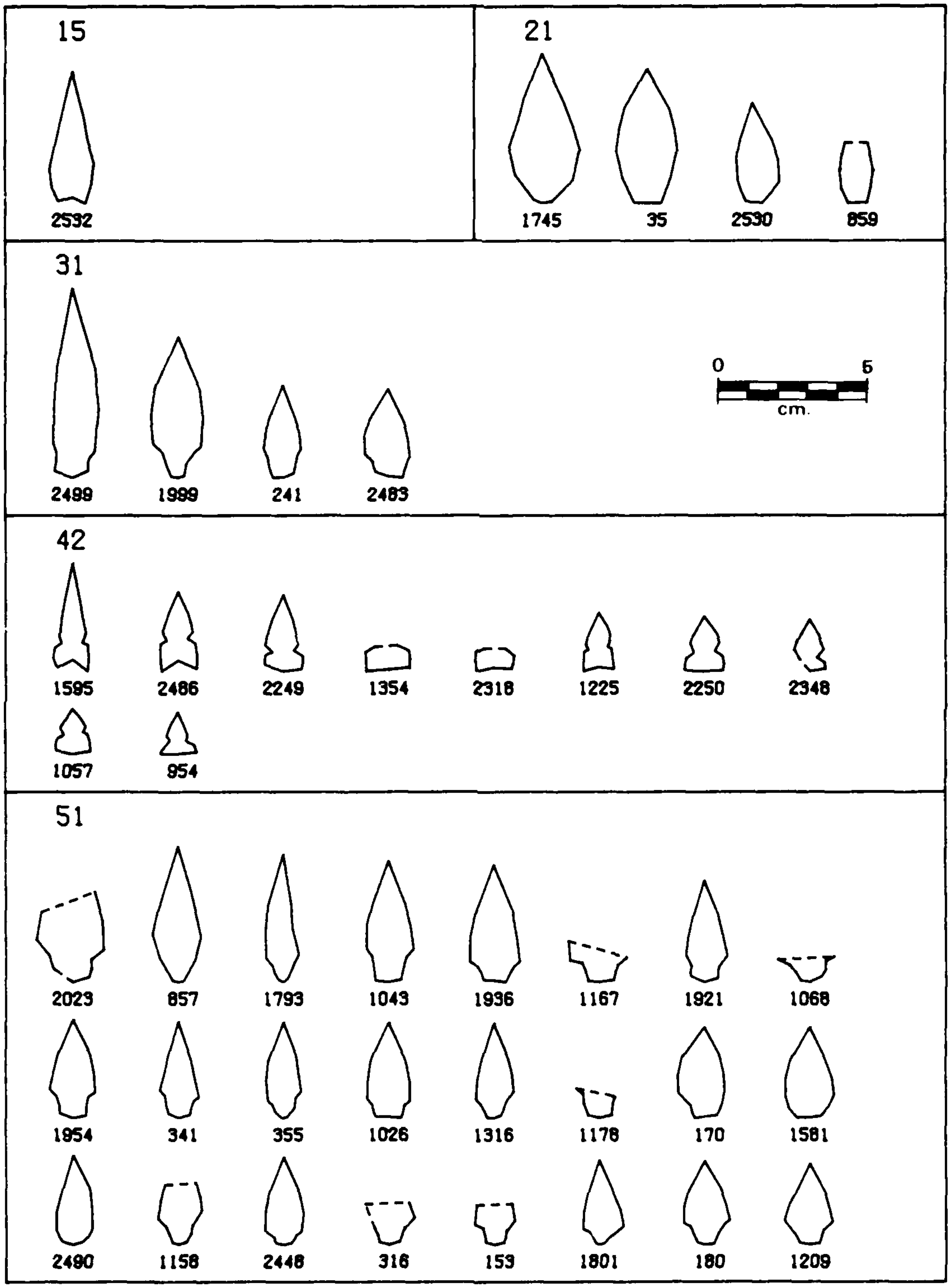

Figure B-1. Projectile point outlines from digitized measurement, 45-OK-258. Upper number is the historic type (see Figure 3-5 for key). Lower number is the master number.

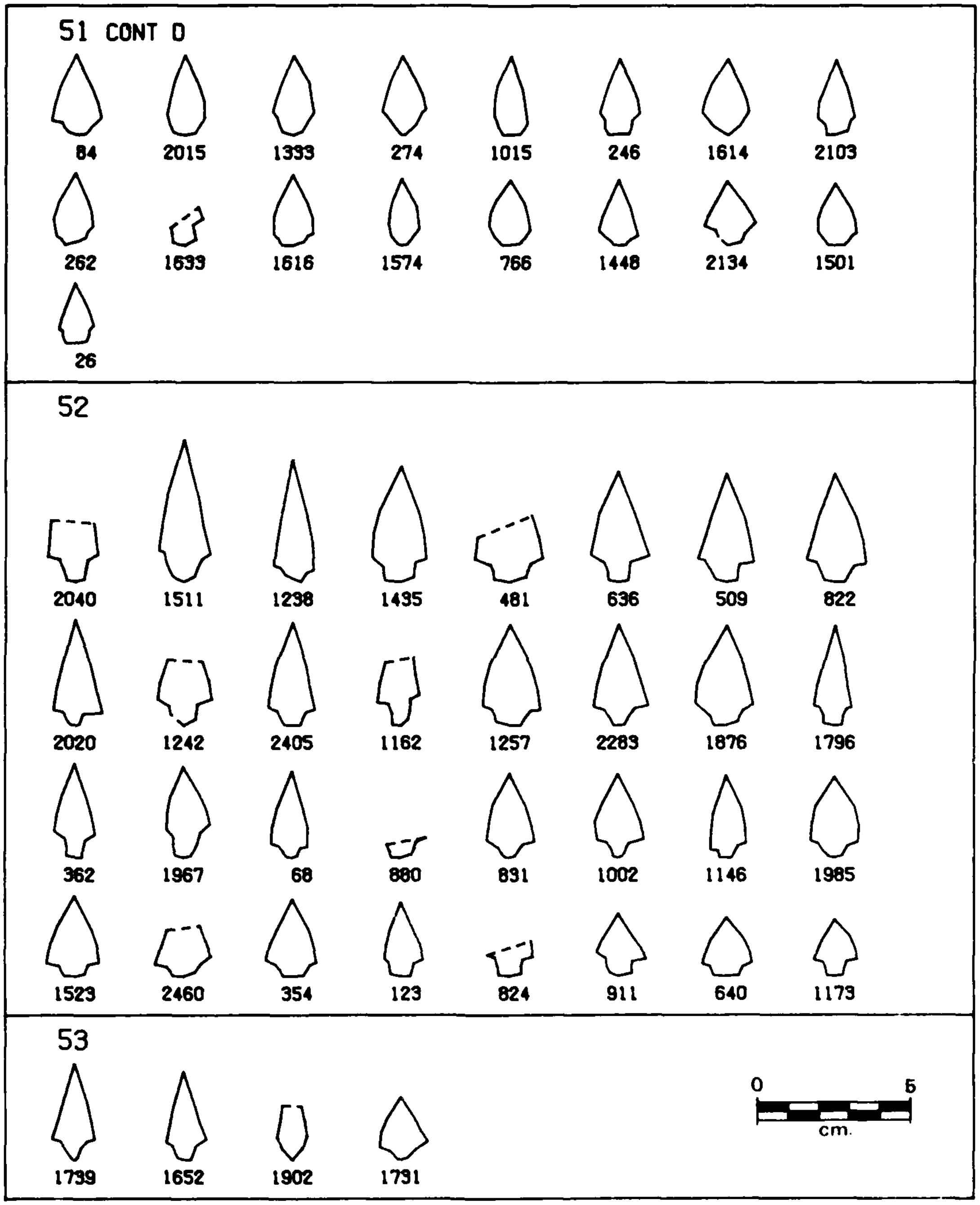

Figure B-1, cont'd.

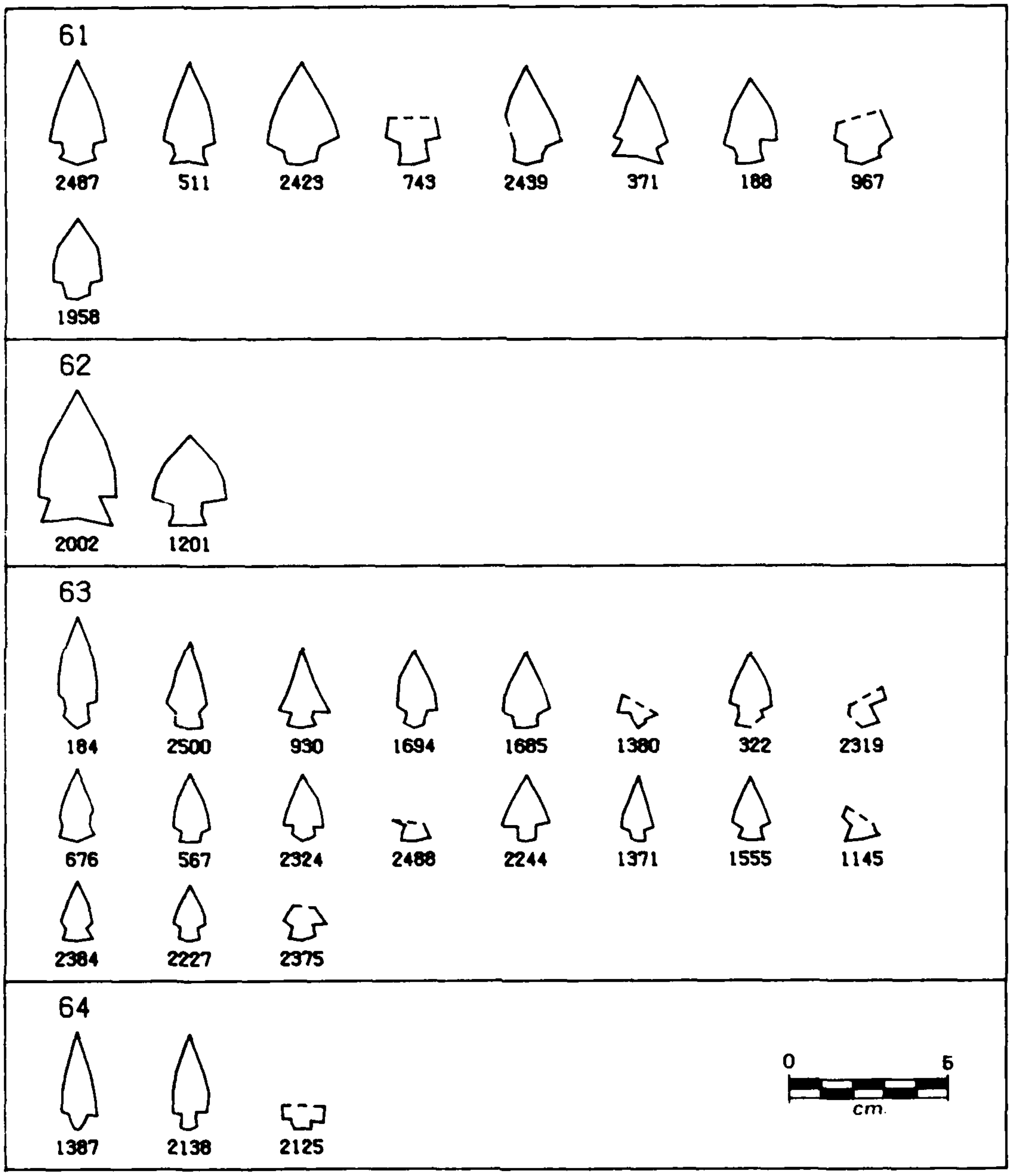

Figure B-1, cont'd.

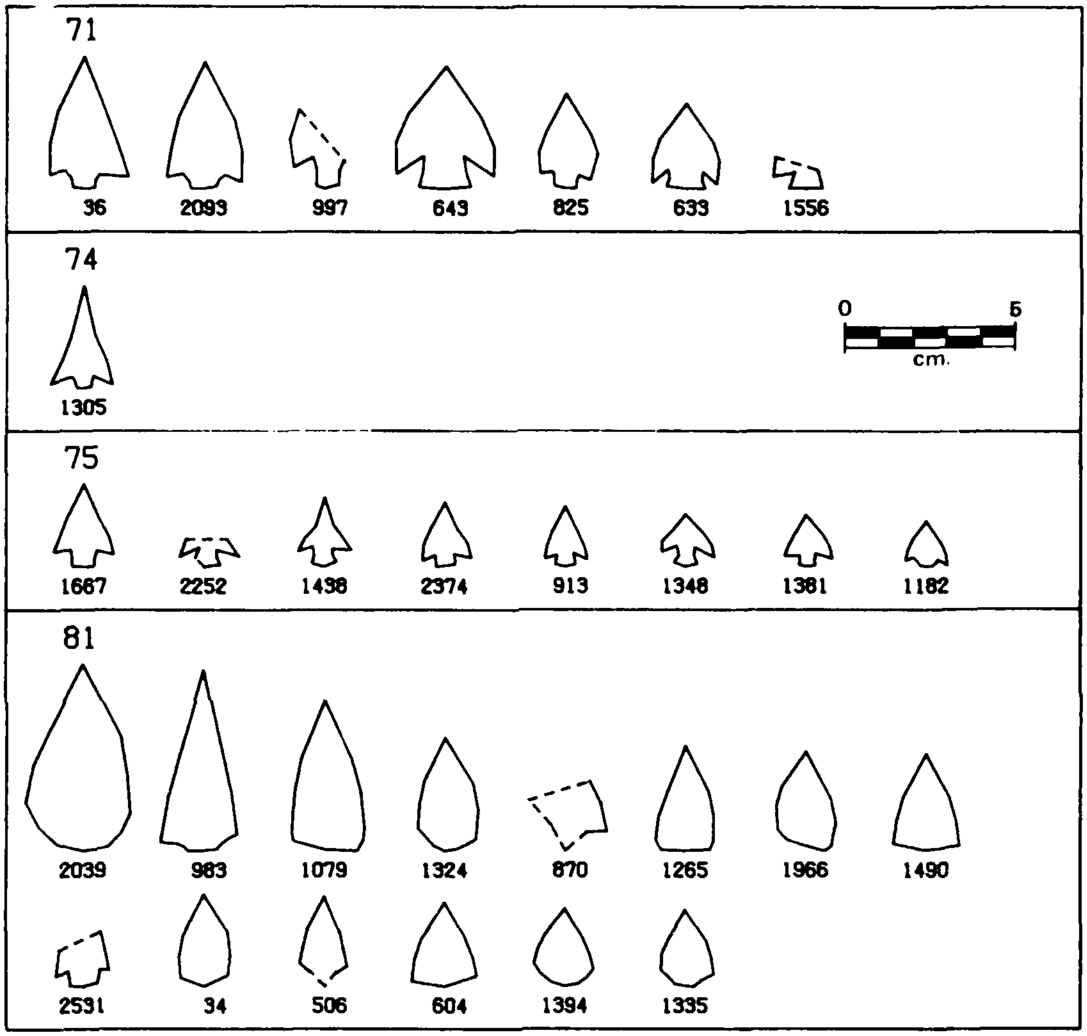

Figure B-1, cont'd.

APPENDIX C:
FAUNAL ASSEMBLAGE, 45-OK-258

Family Leporidae

Lepus cf. townsendii

Hudnut Component: 1 femur fragment, 1 tibia fragment.

Sylvilagus nuttallii

Unassigned: 1 tibia fragment.

Family Sciuridae

Marmota flaviventris

Coyote Creek Component: 1 *mandible fragment*, 1 *molar*, 2 *molar fragments*, 2 humerus fragments, 1 ulna, 1 innominate fragment, 1 astragalus, 1 phalanx.

Hudnut Component: 1 skull fragment, 1 molar, 3 molar fragments, 1 radius, 1 tibia fragment.

Unassigned: 1 molar.

Spermophilus sp.

Hudnut Component: 2 mandible fragments.

Family Geomyidae

Thomomys talpoides

Coyote Creek Component: 2 skulls, 1 skull fragment, 7 mandibles, 4 mandible fragments, 1 scapula fragment, 4 humeri, 2 innominates, 5 femurs, 3 femur fragments, 2 tibias.

Hudnut Component: 2 skulls, 11 skull fragments, 8 mandibles, 26 mandible fragments, 1 atlas vertebra, 1 lumbar vertebra, 2 lumbar vertebra fragments, 3 sacra, 3 scapulas, 1 scapula fragment, 6 humeri, 4 humerus

fragments, 1 radius, 1 ulna, 5 innominates, 7 innominate fragments, 9 femurs, 5 femur fragments, 8 tibias, 3 tibia fragments.

Unassigned: 5 mandibles, 8 mandible fragments, 2 incisors, 8 lumbar vertebrae, 2 scapulas, 7 humeri, 1 humerus fragment, 4 innominate fragments, 3 femurs, 4 tibias.

Family Heteromyidae

Perognathus parvus

Coyote Creek Component: 3 skull fragments, 9 mandibles, 3 mandible fragments, 1 sacrum, 4 humeri, 3 innominates, 1 innominate fragment, 2 femurs, 2 femur fragments, 1 tibia.

Hudnut Component: 4 skulls, 12 skull fragments, 24 mandibles, 7 mandible fragments, 1 incisor, 1 sacrum, 4 humeri, 1 humerus fragment, 10 innominates, 1 innominate fragment, 15 femurs, 9 tibias, 1 tibia fragment.

Unassigned: 3 skull fragments, 7 mandibles, 1 humerus, 1 femur.

Family Castoridae

Castor canadensis

Coyote Creek Component: 1 incisor fragment.

Hudnut Component: 2 incisor fragments, 1 molar.

Family Cricetidae

Coyote Creek Component: 1 skull fragment, 2 mandible fragments, 1 scapula fragment, 1 innominate fragment, 1 femur.

Hudnut Component: 2 skull fragments, 2 mandible fragments, 1 femur.

Unassigned: 1 tibia.

Peromyscus maniculatus

Coyote Creek Component: 1 skull, 3 mandibles, 1 mandible fragment.

Hudnut Component: 11 mandibles, 3 mandible fragments, 2 humeri, 3 innominate fragments, 3 femurs, 2 tibias.

Unassigned: 3 mandibles.

Microtus spp.

Coyote Creek Component: 1 skull fragment, 1 mandible, 1 mandible fragment.

Hudnut Component: 1 skull fragment, 1 mandible, 4 mandible fragments.

Unassigned: 1 mandible, 1 mandible fragment.

Lagurus curtatus

Coyote Creek Component: 2 mandibles, 1 mandible fragment.

Hudnut Component: 1 skull fragment.

Family Erethizontidae

Erethizon dorsatum

Coyote Creek Component: 1 incisor fragment.

Family Canidae

Coyote Creek Component: 1 humerus fragment, 1 astragalus, 2 phalanx fragments.

Hudnut Component: 4 mandible fragments, 2 incisors, 1 canine, 1 canine fragment, 1 premolar, 2 premolar fragments, 6 molars, 3 molar fragments, 2 rib fragments, 1 calcaneus fragment, 3 metapodials, 3 metapodial fragments, 4 phalanx, 1 phalanx fragment.

Canis sp.

Coyote Creek Component: 2 mandible fragments, 6 incisors, 1 canine fragments, 7 premolars, 5 molars, 1 molar fragments, 1 femur fragment, 1 tibia fragment.

Hudnut Component: 1 skull fragment, 5 mandible fragments, 6 incisors, 1 canine, 1 canine fragment, 6 premolars, 2 premolar fragments, 3 molars, 1 atlas, 2 caudal vertebra, 1 radius fragment, 1 tibia, 1 metapodial fragment.

C. latrans

Coyote Creek Component: 1 carpal.

Hudnut Component: 1 tarsal.

C. lupus

Hudnut Component: 1 metapodial fragment.

C. familiaris

Hudnut Component: 1 skull fragment, 2 mandible fragment, 3 incisors, 1 incisor fragment, 3 canine fragments, 3 premolars, 1 molar, 1 molar fragment, 1 atlas, 1 axis, 4 thoracic vertebra, 5 lumbar vertebrae, 1 sacrum, 1 caudal vertebra, 21 rib fragments, 1 scapula fragment, 2 humerus fragments, 1 radius fragment, 1 ulna fragment, 2 innominate fragment, 1 femur, 1 femur fragment, 1 tibia fragment, 1 fibula fragment, 1 calcaneus, 1 calcaneus fragment, 15 metapodials, 31 phalanges, 2 patella.

Vulpes vulpes

Hudnut Component: 2 mandible fragments, 3 molars.

Family Ursidae

Ursus sp.

Coyote Creek Component: 2 metatarsal fragments.

Hudnut Component: 1 metacarpal, 1 metapodial fragment.

Family Mustelidae

Martes americana

Hudnut Component: 1 mandible fragment, 1 premolar, 3 molars.

Martes pennanti

Coyote Creek Component: 1 mandible fragment, 2 premolars, 1 molar.

Hudnut Component: 1 humerus fragment, 1 radius, 1 femur fragment.

Mustela frenata

Hudnut Component: 1 mandible.

Taxidea taxus

Hudnut Component: 1 maxilla fragment.

Family Equidae

Equus caballus

Coyote Creek Component: 1 mandible fragment, 5 incisors, 4 molars, 1 molar fragment, 1 axis, 6 cervical vertebrae, 1 innominate fragment.

Family Cervidae

Coyote Creek Component: 4 antler fragments.

Hudnut Component: 53 antler fragments.

Unassigned: 3 antler fragments.

Cervus elaphus

Coyote Creek Component: 1 incisor fragment, 1 molar, 2 molar fragments.

Hudnut Component: 9 antler fragment, 1 molar fragment.

Odocoileus sp.

Coyote Creek Component: 27 antler fragments, 33 skull fragments, 40 mandible fragments, 59 incisors, 20 incisor fragments, 98 premolars, 11 premolar fragments, 96 molars, 807 molar fragments, 5 scapulas, 8 scapula fragments, 6 humerus fragments, 14 radius fragments, 8 ulna fragments, 44 carpals, 16 metacapal fragments, 6 innominate fragments, 5 femur fragments, 10 tibia fragments, 20 astragali, 2 astragalus fragments, 5 calcanea, 1 calcaneus fragment, 8 tarsals, 21 metatarsal fragments, 23 metapodial fragments, 24 phalanges, 74 phalanx fragments, 1 dewclaw fragment, 4 sesamoids.

Hudnut Component: 157 antler fragments, 57 skull fragments, 2 mandibles, 99 mandible fragments, 109 incisors, 24 incisor fragments, 232 premolars, 14 premolar fragments, 239 molars, 678 molar fragments, 2 scapulas, 18 scapula fragments, 11 humerus fragments, 17 radius fragments, 10 ulna fragments, 30 carpals, 20 metacarpal fragments, 8 innominate fragments, 3 femur fragments, 7 tibia fragments, 18 astragali, 2 astragalus fragments, 4 calcanea, 1 calcaneus fragment, 11 tarsals, 18 metatarsal fragments, 9 metapodial fragments, 10 phalanges, 32 phalanx fragments, 1 dewclaw fragments, 1 sesamoid.

Unassigned: 1 mandible fragment, 1 incisor, 5 incisor fragments, 3 premolars, 2 molars, 92 molar fragments, 1 metacarpal fragment, 1 innominate fragment, 1 astragalus, 1 calcaeus fragment, 1 phalanx, 3 phalanx fragments.

Family Antilocapridae

Antilocapra americana

Coyote Creek Component: 1 skull fragment, 2 premolars, 1 premolar fragment, 4 molars, 6 molar fragment, 1 radius fragment, 2 carpals, 2 astragali, 1 metatarsal fragment, 1 phalanx, 7 phalanx fragments.

Hudnut Component: 1 skull fragments, 2 mandible fragments, 1 premolar, 3 premolar fragments, 2 molar fragments, 1 metatarsal fragment, 1 metapodial fragment.

Unassigned: 1 premolar, 1 radius fragment, 1 phalanx fragment.

Family Bovidae

Coyote Creek Component: 4 incisors, 3 incisor fragments, 91 molar fragments.

Hudnut Component: 1 incisor, 1 incisor fragment, 81 molar fragments.

Unassigned: 4 molar fragments.

Ovis canadensis

Coyote Creek Component: 62 horn core fragments, 12 skull fragments, 14 mandible fragments, 15 incisors, 4 incisor fragments, 26 premolars, 3 premolar fragments, 58 molars, 26 molar fragments, 1 atlas, 2 scapulae, 3 scapula fragments, 2 humerus fragments, 8 radius fragments, 3 ulna fragments, 7 carpals, 3 metacarpal fragments, 4 tibia fragments, 7 astragali, 5 calcanea, 12 tarsals, 7 metatarsal fragments, 14 metapodial fragments, 21 phalanges, 24 phalanx fragments, 1 sesamoid.

Hudnut Component: 25 horn core fragments, 3 skull fragments, 11 mandible fragments, 7 incisors, 29 premolars, 32 molars, 19 molar fragments, 1 atlas, 1 axis, 1 cervical vertebra, 1 cervical vertebra fragment, 1 scapula, 4 scapula fragments, 1 radius fragment, 1 ulna fragment, 6 carpals, 1 carpal fragment, 2 innominate fragments, 2 astragali, 1 metatarsal fragment, 6 metapodial fragments, 9 phalanges, 1 phalanx fragment.

Unassigned: 1 incisor, 1 molar fragment.

Deer-Sized

Coyote Creek Component: 95 skull fragments, 56 mandible fragments, 16 molar fragments, 1 atlas fragment, 4 axis fragment, 14 cervical vertebrae, 1 cervical vertebra fragment, 43 thoracic vertebra fragments,

57 lumbar vertebra fragments, 4 sacrum fragments, 42 vertebra fragments, 980 rib fragments, 5 sternum fragments, 61 costal cartilage fragments, 113 scapula fragments, 74 humerus fragments, 97 radius fragments, 62 ulna fragments, 21 carpals, 15 carpal fragments, 61 metacarpal fragments, 33 innominate fragments, 102 femur fragments, 129 tibia fragments, 12 astragali, 25 astragalus fragments, 20 calcaneus fragments, 10 tarsals, 9 tarsla fragments, 111 metatarsal fragments, 250 metapodial fragments, 13 phalanx fragments, 42 dewclaw fragments, 45 sesamoids, 9 sesamoid fragments, 1 hyoid, 3 hyoid fragments.

Hudnut Component: 132 skull fragments, 77 mandible fragments, 4 incisor fragments, 1 molar fragment, 10 atlas fragments, 8 axis fragments, 41 cervical vertebra fragments, 26 thoracic vertebra fragments, 61 lumbar vertebra fragments, 2 sacrum fragments, 33 vertebra fragments, 861 rib fragments, 5 sternum fragments, 88 costal cartilage fragments, 126 scapula fragments, 88 humerus fragments, 96 radius fragments, 63 ulna fragments, 13 carpals, 7 carpal fragments, 68 metacarpal fragments, 37 innominate fragments, 113 femur fragments, 166 tibia fragments, 1 astragalus, 40 astragalus fragments, 16 calcaneus fragments, 4 tarsals, 13 tarsal fragments, 163 metatarsal fragments, 266 metapodial fragments, 83 phalanx fragments, 23 dewclaw fragments, 51 sesamoids, 3 sesamoid fragments, 1 hyoid fragment.

Unassigned: 3 skull fragments, 1 mandible fragment, 1 atlas fragment, 1 thoracic vertebra fragment, 30 rib fragment, 3 humerus fragment, 1 radius fragment, 2 ulna fragments, 3 metacarpal fragments, 4 femur fragments, 4 tibia fragments, 3 astragalus fragments, 1 calcaneus fragment, 1 tarsal, 6 metatarsal fragments, 16 metapodial fragments, 7 phalanx fragments, 2 sesamoids.

Elk-sized

Coyote Creek Component: 1 rib fragment, 1 radius fragment, 1 metatarsal fragment, 5 metapodial fragments.

Hudnut Component: 1 cervical vertebra fragment, 2 lumbar vertebra fragment, 1 radius fragment, 2 carpals, 1 femur fragment, 1 metapodial fragment.

Family Chelydridae

<u>Chrysemys picta</u>

Coyote Creek Component: 18 shell fragments.

Hudnut Component: 56 shell fragments.

Family Colubridae

Coyote Creek Component: 10 vertebrae.

Hudnut Component: 68 vertebrae, 2 vertebra fragments.

Unassigned: 5 vertebrae.

Family Ambystomatidae

Ambystoma spp.

Coyote Creek Component: 35 vertebrae.

Hudnut Component: 40 vertebrae.

Family Salmonidae

Coyote Creek Component: 7 vertebrae, 13 vertebra fragments.

Hudnut Component: 12 vertebrae, 43 vertebra fragments, 6 otolith, 4 otholith fragments.

Unassigned: 4 vertebrae, 4 vertebra fragments, 1 otolith fragment.

Family Cyprinidae

Coyote Creek Component: 6 vertebrae, 1 vertebra fragment.

Hudnut Component: 27 vertebrae, 6 vertebra fragments.

Unassigned: 4 vertebrae.

APPENDIX D:

DESCRIPTION OF CONTENTS OF UNCIRCULATED APPENDICES

Detailed data from two different analyses are available in the form of hard copies of computer files with accompanying coding keys.

Functional analysis data include provenience (site, analytic zone, excavation unit and level, and feature number and level (if applicable); object master number; abbreviated functional object type; and coding that describes each tool on a given object. Data normally are displayed in alphanumeric order by site, analytic zone, functional object type, and master number. Different formats may be available upon request depending upon research focus.

Faunal analysis data include provenience (site, analytic zone, excavation unit and level, feature number, and level (if applicable); taxonomy (family, genus, species); skeletal element; portion; side; sex; burning/butchering code; quantity; and age. Data normally are displayed in alphanumeric order by site, analytic zone, provenience, taxonomy, etc.

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